THE IRON TRADE REVIEW

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HOPE

SPRINGS FROM BETTER FINANCIAL CONDITIONS

But Market Does Not Improve—Important Developments in Pig Iron Awaited with Keen Interest.

The over-subscribing of the Pennsylvania 4 per cent bond issue of $40,000,000 and the prospect that other railroads may be likewise successful in financial operations have caused some improvement in sentiment in the iron world, but actual conditions are not better, as slight increases in some lines are offset by decreased activity in other products.

First Iron Ore Sale

The first sale of iron ore for delivery after May 1 at agreed prices has been made, it being a block of 50,000 tons for a southern Ohio interest. It is not expected that this small sale will be quickly followed by others, but ore interests are urging upon customers the importance of deciding at some time in the near future what their probable purchases will be. Little mining has been done on the ranges of the Lake Superior region during the winter, and plans for a decided decrease in summer mining have been made. Some interests believe that a still further restriction of operations would be advisable, and if there should be active opposition on the part of employes to the enforcement of the open shop principle, it might become impossible to ship enough ore to meet even the limited requirements of the furnaces. Ore interests show no disposition to waver in adhering to announced prices.

Railroad Buying

The Pennsylvania Railroad Co. advises us that its new bond issue will be used to meet the expenditures on its New York terminal and complete improvements on the main line which are now under way. The company adds that, with nearly 90,000 idle cars and 500 idle locomotives on its hands, it could hardly be making plans for the purchase of additional equipment. Railroad buying of rails has been light, although there are numerous inquiries for small tonnages from some of the lesser companies. The New York Central has closed a contract with the Carnegie Steel Co. for 10,000 kegs of spikes.

Pig Iron Conditions

A crisis is imminent in the pig iron market. Owing to the general circulation of the report that powerful interests are in favor of adopting a new schedule based on $10 Birmingham, which would result in selling pig iron in many parts of the country at less than cost, only such buyers as were compelled to come into the market for immediate needs have been placing orders, and keen interest is manifested in meetings to be held next week and later in the month. While the probability seems to be in favor of low prices, there is a possibility that an important proposition in harmony with the general movement in favor of maintaining reasonable prices will be submitted by some interests that have been credited with making low quotations. Should this proposition be accepted, peace may result.

Traction Prospects

Owing to the settlement of the seven years' traction war in Cleveland, it is expected that about 40 miles of track will be laid at a not far distant date. Laying of new tracks has, in fact, already commenced, and an inquiry for 1,500 tons for the Superior avenue line is expected soon. Among the prospects not yet clearly developed is the proposed steel barge line from St. Louis to New Orleans.

Merchant Pipe

Merchant pipe has shown steady improvement during the past month, and present conditions are encouraging. Some large inquiries are pending. The activity of tin plate and wire continues. Careful inquiry develops that a very large part of the immense tonnage of wire sold in recent months has passed into the hands of the ultimate consumers. Many small orders for cast iron pipe, making a very fair total, are being received every week..

AMERICAN STEEL

BECOMING A FACTOR IN GREAT BRITAIN.

Stagnation Prevails in Most Lines and Imports From United States Increase.—Tin Plate Business Good.

Office of THE IRON TRADE REVIEW, Prince's Chambers, Corporation St., Birmingham, Eng., April 18.

The past month has seen a marked declension in the iron trade, and the most optimistic now find it difficult to speak cheerfully of its prospects. The quarterly meeting was remarkably barren of new business, and buying has once more ceased. The mills in all directions are short of orders, and are bidding for business at lower and still lower rates. The Easter holiday will bring with it an almost complete shutdown for the week. The marked bar trade is the only department which shows any strength, but this affects less than half a dozen firms, and is of decreasing importance. In the unmarked bar lines, cutting is very prevalent, orders now being taken as low as £6 7s 6d, and £6 5s for common nut and bolt qualities. The tube trade is bad, and this stagnation will be the precursor of further reductions in strip iron. The galvanized sheet trade shows slightly more life, partly because of its excellent foreign demand. But for steel varieties, this industry is to an increasing extent buying American steel, so that the British makers are deprived of this very useful branch of their demand. Every week sees a larger number of American sheet bars and billets shipped at Newport. The effect has been to depress British prices, so that both Bessemer and Siemens bars have lost the recent advantage and are down again to £4 10s and £4 12s 6d, respectively.

Rumors of combines both in regard to steel producers and the makers of iron and steel tubes are very prevalent, and I hear on good authority that American makers of steel have an arrangement with the makers of British sheets to sell them large quantities of metal on the understanding that our South American markets for sheets are not interfered with.

THE WEEK IN IRON CENTERS

PITTSBURG.

Pig Iron Market Dull and Prices Sagging—Bar Iron Prices Reaffirmed.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., April 28.

Conditions in iron and steel lines continue to progress very slowly. No marked advances are observable with the addition of another month to the period through which the process of readjustment has been working. It is equally apparent that there has been no material loss of ground.

The more active products of a month ago, tin plate, wire, sheets and merchant pipe are still active, some in a slightly greater degree; those lines which have moved sluggishly, such as billets and bars, may not have gained, but they have lost little in strength; structural material and rails are a trifle improved, but highly-finished commodities, including shafting, nuts and bolts, appear more affected by the depression.

Pig iron, the most unsatisfactory element in the situation, a month ago, has grown more unstable with the continued activity of certain furnace interests in successively underbidding the market. During April, the foundry iron market from the Mahoning and Shenango valleys declined practically $1 a ton and Bessemer and basic slightly less. How long this state of affairs will continue to prevail before some action is taken to settle the market upon a definite basis, seems to rest upon the amount of forbearance which the less-aggressive furnaces are inclined to extend. There is certainly little prospect for improvement under the prevailing conditions.

The month of April, as respects aggregate tonnage, can scarcely be said to have maintained the rate of improvement, which prevailed throughout the greater portion of March. The period has nevertheless been productive of developments which are regarded as playing their part in the crystallization of general sentiment and in the calming of commercial unrest into a clearly defined and progressive movement. In this connection, the over-subscription of the Pennsylvania railroad is seen as concrete evidence of a better faith on the part of the investment public, even though the securities offered were of the gilt-edged type. The good influence which is expected to spread from this transaction, rather than from the expenditure which it involves, is expected to stimulate other sound financing propositions and eventually to lend itself to the improvement of the iron and steel industry.

As to prices in finished and semi-finished iron and steel lines, there is uniform firmness being shown. Western bar iron makers at a meeting in Cleveland the past week saw no reason for changing their position and reaffirmed the 1.50 cent Pittsburg basis.

Pig Iron.—Developments in pig iron in the past week have only tended to emphasize the abnormal state, to which the conflicting factors in the situation, have forced the market. With certain interests dominating the field in their determination to get tonnage, the market is an open one and prices are suffering in consequence. Exceptional consideration is being extended the buyer. The usual price differentials between the various classes of iron by analysis are not being observed wherever this spread might stand in the way of a sale. A local iron and steel interest purchased 300 tons of foundry iron, analyzing 2.75 per cent and upward in silicon at the price of $15 valley or $15.90 delivered Pittsburg. The iron is for delivery over the remainder of the year. This being clearly a No. 1 iron would indicate, under the usual practice, that the No. 2 market was about $14.50 valley. But this is not the case. We note the sale this week of 1,000 tons of No. 2 iron for delivery up to August, at about $14.75 valley furnace, or $15.65 delivered to the plants of the purchaser in this territory. The Westinghouse Electric & Mfg. Co. also took 100 tons each of its own Nos. 1, 2 and 3 classification for delivery in the near future. No. 1, Westinghouse classification, corresponds to No. 3 standard specifications, No. 2 to No. 2, and No. 3 to No. 1. The prices of the three grades are understood to have been $15.15, $15.60 and $16 delivered, making No. 2 about $14.70 valley basis. Companies also report having sold No. 2 iron in the week at $15 valley or $15.90 delivered Pittsburg. There is a fair inquiry for small lots of foundry iron, largely for prompt shipment and it is generally believed that the foundries are having a larger melt, as iron on contract is moving better. Bessemer iron is dull and sales in small amounts are being made at about $16.25 valleys or $17.15, delivered in this district.

The basic situation is relatively firm. The American Steel Foundries took 300 tons for delivery at Alliance, O., on a basis of about $15.25 valley, but it is understood the iron did not go to a valley furnace. Two Ohio interests are asking quotations on about 1,500 tons. The market appears well settled at from $15.25 to $15.50 valley basis.

As respects stocks of Bessemer and basic iron in the valleys, May will be begun under practically the same conditions existing April 1, with the tonnage estimated at about 58,000. The past week has shown the figures about stationary.

A northern Ohio melter has an inquiry out for upwards of 1,000 tons of malleable and has obtained quotations of $15.50 furnace for delivery through August and $17 for thereafter. We quote the malleable market from $15.50 to $16 valleys. Gray forge is being offered at $14.25 valleys.

On prompt and second quarter delivery on northern iron, we quote as follows:

Bessemer, valley	$16.25 to 17.25
Bessemer, Pittsburg	17.15 to 18.15
No. 1 foundry, Pittsburg	15.90 to 16.40
No. 2 foundry, Pittsburg	15.65 to 15.90
Gray forge, Pittsburg	15.15 to 15.40
Basic, valley	15.25 to 15.50
Basic, Pittsburg	16.15 to 16.40

Ferro-Manganese.—While there has been some sounding of the market on forward business, sales of ferro-manganese have been in carloads and small tonnages for prompt shipment. The market has stiffened slightly, and $43 Baltimore or $44.95 Pittsburg for prompt shipment is now being quoted on 80 per cent ferro-manganese for prompt shipment. There is a little ferro-silicon business going at the prevailing figure.

Imported 50 per cent ferro-silicon is quoted $77 Pittsburg on forward deliveries; domestic 12 per cent, $29; 11 per cent, $28; 10 per cent, $27. The lower grades of imported ferro-silicon are quoted 50 cents lower. These quotations are applicable to Pittsburg territory.

Plates.—The plate market exhibits no material changes, and the activity of this product is very moderate. One of the ship building companies is getting figures on steel plates for two new freighters, the contracts for whose construction were let two months ago, and it is expected that an order will be placed soon for the plates required. This was one of the first evidences this season of any new construction plans by lake ship interests. Mill operations are irregular,

full capacities being worked one week and light schedules the next. There is some shading of prices on light gages by small independent mills, but the large makers are holding strictly to schedule, and we quote:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.70c f. o. b. mill Pittsburg. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary fire-box steel plates, 0.20; still bottom steel, 0.30c; marine steel, 0.40c; locomotive fire-box steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edges, 0.10c; under 3/16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—The sheet trade continues to support about a 50 per cent activity of the mills. Refrigerator and range manufacturers have worked off the greater portion of their stocks, and are beginning to place new contracts. Galvanized grade continues the most active. There is a little shading of prices by small independent mills, and we continue to quote:

Black steel sheets, one pass, cold rolled: Nos. 11-12, 2.10c; Nos. 13-14, 2.15c; Nos. 15-16, 2.20c; Nos. 17-21, 2.25c; Nos. 22-24, 2.30c; Nos. 25-26, 2.35c; No. 27, 2.40c No. 28, 2.50c; No. 29, 2.60c; No. 30, 2.70c. Galvanized: Nos. 10-11, 2.45c; Nos. 12-14, 2.55c; Nos. 15-16, 2.65c; Nos. 17-21, 2.80c; Nos. 22-24, 2.95c; Nos. 25-26, 3.15c; No. 27, 3.35c; No. 28, 3.55c; No. 29, 3.70c; No. 30, 3.95c. Blue annealed: Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c. Corrugated roofing, $1.75 per square for No. 28 painted, 2½-inch corrugation, and $3.10 per square on galvanized roofing, 2½-inch corrugation, No. 28.

Tin Plate.—With the starting of the 11 mills of the Demmler plant which is scheduled for May 4, the American Sheet & Tin Plate Co. will have in operation practically all of its workable capacity. Delay in obtaining raw material prevented the putting on of this plant this week as originally intended. Canners and miscellaneous canning interests are actively taking tin plate tonnage, and business continues at a normal volume. We quote:

Coke tin plate, 100-pound basis, 14 x 20, $3.70 f. o. b. mill, Pittsburg district. Terms, 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material.—Some of the railroads and other interests which had held up shipment on a large tonnage of standard sections with the local maker, are giving releases on a part of this material and the rail situation accordingly shows some improvement. This tonnage, as well as current orders, is now being rolled at the Edgar Thomson works, where all the mills are operating at restricted output with fair prospects for continued activity. The settlement of the coal miners' strike has stimulated interest in light rails, and sales of the week amount to about 2,000 tons. The B. & O. railroad has recently taken about 3,000 kegs of standard railroad spikes and the Erie has also done some buying, while the New York Central has contracted for 10,000 kegs. Rerollers continue to quote low prices on light rails. On present specifications on Bessemer rails we quote as follows:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $36; 12-pound, $32; 16-pound, $30; 20-pound, $29; 25 to 45-pound, $28; angle splice bars for standard sections, $1.65; standard spikes, $1.70 to $1.80 Pittsburg; hand spikes, $1.80 to $1.90 Pittsburg.

Steel.—Billet business is extremely dull as far as new orders are concerned. Specifications against present contracts constitute about the only element of life in the situation. Prices are being maintained. Sheet and tin bars are relatively active on specifications. Reports of shading are not given much credence.

We continue to quote Bessemer and open-hearth billets $28 Pittsburg and forging billets at $30 Pittsburg, subject to the division of the freight charge over $1 and not exceeding $3, and sheet and tin bars at $29.50 Pittsburg, valley and Wheeling territory, and $29 Pittsburg for delivery to other points.

Hoops, Bands and Cotton Ties.—There is no buying of cotton ties at present, the main movement having ceased. No further contracting is expected before July 1, when the extent of the crop will be more clearly defined. Hoops are comparatively active. Prices are firm. We continue to quote the following official prices:

Cotton ties, 85c per bundle Pittsburg, plus the freight on lots of 3,000 bundles or more, and 88c per bundle Pittsburg for less than 3,000 bundle lots.

Hoops in carload lots, 2c; in less than carload lots, 2.10c; bands, 1.60c; base half extras as per standard steel.

Merchant Bars.—There are indications that buying of bar iron in considerable volume by the railroads may be expected in the near future. A moderate increase in the bar iron trade from the railroads is noted at present for car repair purposes, and one car builder has an inquiry out for 2,500 tons of car iron. Prices of bar iron are being maintained by the large producers, and at a meeting of the western makers in Cleveland the past week, present prices were reaffirmed. Steel bars are quiet. Shafting specifications are better, jobbers drawing against contracts placed before the recent change of prices. Low prices are being named by rerollers in some steel specialties. We quote:

Common iron bars, 1.50c Pittsburg in carload lots and over; 1.60c in less than carloads; 1.47c to 1.50c base Pittsburg plus freight to point of shipment on western deliveries; Bessemer steel bars, 1.60c; plow and cultivator, 1.60c; channels, angles, zees, tees, under 3 inches, 1.70c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 56 per cent in carloads, and 52 per cent in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. Planished and machine straightened tire steel is 1.80c base. Iron finished tire under 1½ by 1½ inches, 1.75c; iron finished tire, 1½ by 1½ inches and over, 1.60c base. All tire subject to ½ extra on the steel card.

On cold rolled strip steel, widths 1½ inch and wider and 0.100 inch and thicker, we quote base prices per 100 pounds, $3.60 on hard and $3.75 on soft.

Structural Material.—New projects in construction lines are not developing with accustomed quickness for this time of the year, and the situation is comparatively quiet in respect to contracts placed. Inquiries are a little improved as to number, and there is considerable estimating under way, but reluctance is being shown in putting these plans under contract. The erection of a building by the Dollar Savings and the First National Banks, Youngstown, O., for which a general contract has been let, will require about 350 tons. Bids have been opened, but no awards yet made for 436 tons for the First National Bank, Connellsville, Pa., and 650 tons for the Y. M. C. A. building in

Indianapolis. Several good-sized undertakings in this district are being held up for financial reasons. Fabricating prices appear lower, but the mills are holding strictly to schedule on structural steel. Plant capacities continue to be run unsteadily. We quote:

Beams and channels, 15-inch and under, 1.70c; over 15 inches, 1.80c; zees, 1.70c; tees, 1.75c; angles from three to six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.70c base.

Merchant Pipe.—The month of April has exhibited throughout a moderate but steady improvement in merchant pipe demand over March, which in turn was marked by some recovery. At present, conditions are encouraging to makers as it is noted that more business is coming direct to the mills and single orders are in larger volume. Some large inquiries are appearing and one gas interest is in the market for about 600 tons of gas line and miscellaneous pipe. The large inquiry by California oil interests, calling for 140 miles, which came out recently, is not expected to be placed for several months. Confidence is being expressed that prices will not be changed within the next several months, if at all. Present quotations to the general trade are firm. Spang-Chalfant & Co. this week started their puddle mills, muck mill and 16-inch mill of their Aetna works, which have been idle since sometime in January. We continue to quote the following official discounts to consumers in carload lots with an additional one point and five off to jobbers:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch.....	65	49	63	..
⅜ inch	67	53	65	51
½ inch	69	57	67	55
¾ to 6 inches.....	73	63	71	61
7 to 12 inches.....	70	55	68	53
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch.....	58	46	56	44
½ to 4 inches.....	65	53	63	51
4½ to 8 inches.....	61	49	59	47
DOUBLE EXTRA STRONG PLAIN ENDS.				
½ to 8 inches.....	54	43	52	41

Boiler Tubes.—The trade in boiler tubes has been improving gradually and is now fairly steady. The railroads are buying in a desultory fashion. Reports of shading are not frequent and in the main, prices are being upheld by manufacturers. We quote the following discounts:

	Iron.	Steel.
1 to 1½ inch.....	42	47
1¾ to 2¼ inch.....	42	59
2½ inch	47	61
2¾ to 5 inch.....	52	65
6 to 13 inch.....	42	59

2¼ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 per cent net extra.

Wire Products.—The demand for wire products is holding at an even gait but the jobbers are taking material for stock in a guarded manner. Nail business is good generally. Fencing trade is holding up strongly. Prices are firm and we quote:

Wire nails, jobbers' carload lots, $2.05; retailers' carload lots, $2.10; less than carloads, $2.15; painted barb wire, $2.20 for jobbers in carloads; retailers in carloads, $2.25; and less than carloads, $2.35, with 30c for galvanizing; plain wire, 1.90c for jobbers, and 1.95c by carload.

Wire Rods.—New business in wire rods is light, and manufacturers are specifying for their needs against existing contracts. We quote nominally $35 Pittsburg on Bessemer and $36 Pittsburg on open-hearth rods.

Coke.—The market in coke is no firmer and prices being made, represent to a large extent, the degree of eagerness of the oven interest to realize upon stock at hand. Some foundry coke on track is being taken below $2, but on standard 72-hour Connellsville coke, the principal producers are holding from $2.15 to $2.40 ovens for either prompt or future shipment. There is a small increase in the amount of business being closed. Standard 48-hour Connellsville furnace coke is held from $1.65 to $1.75 ovens for any shipment, but lower than this price is being done in special cases and in other grades. For the week ending April 18, the figures of the *Courier* show a production of 147,786 tons and 14,265 out of 37,474 ovens in blast, against 147,148 tons and 14,251 active ovens, the preceding week.

Old Material.—Nothing has developed to inject any new life into the old material market and dullness is the prevailing note. The tonnage moving is light and one of the principal consumers in this district, who has been specifying fairly well, has notified dealers to cease shipments for the time being. A large producer of scrap in the Pittsburg territory, is declining to sell its guaranteed low phosphorus scrap at less than $17. Prices are nominal and we continue to quote:

Heavy melting scrap, $12.50 to $13; ic rolling rails, $14 to $14.25; bundled sheet scrap, $8.50 to $9; iron axles, $18.50 to $19.50; old iron rails, $15 to $16; No. 1 wrought scrap, $13.50 to $14; old car wheels, $14 to $14.50; low phosphorus scrap, $15.50 to $16; machine shop turnings, $8.25 to $8.75; cast borings, $7.75 to $8.25; No. 1 cast scrap, $14.25 to $14.75.

CHICAGO.

Very Quiet Week in All Lines—Satisfactory Wire Conditions.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, April 28.

From the standpoint of interesting tonnage sales the week has been without feature. In all lines of production, the movement of material was light. Rumors of cut prices continue to be rife. Very little structural tonnage was placed and the rail situation added nothing of interest. While one of the sheet mills of this territory reports its order books well filled with contracts and specifications, the general demand for sheets appears to have decreased very materially. There were no significant changes in prices of any of the finished materials or pig iron. Certain facts, however, become increasingly apparent regarding the general market. For instance, the pig iron market, however much it may be considered as separated from the trade in finished materials, will not be restored to normal conditions independently of a general improvement. Price manipulations, whether they be to hold the level artificially or to cut things to the core, will accomplish results affecting the tonnage of iron purchased, only in so far as they place the market in a position from which it can recover most easily. The opinion of the buying interests regarding the proper time and price at which to buy pig iron in quantity for future delivery is largely affected by the opinion held concerning the general condition in other materials. Uncertainty as to the stability of prices on finished materials lends uncertainty to the price of pig iron even though pig iron be selling below cost. The trade so far has failed to understand any other factors in the business equation at times like these save such as represent a scurrying after orders at the best price obtainable. In short, the trade has not figured out as yet why the roof does not fall in when the visible columns are all down. The trade figures that even those who move in on the ground floor of the present business structure will be hurt, if the sky hooks should let the roof go. The trade must see something tangible between the roof and the foundation. It is easier to build up on top of the ruins than to dig out through them from the cellar.

Pig Iron.—Inquiries for iron in lots of 1,000 and 1,500 tons and aggregating about 5,000 tons have appeared during the week and there was placed mostly in small lots more than 3,500 tons of orders. Of this but little iron was for delivery later than the second quarter. Generally the week exhibited greater strength though nothing has developed to insure any continuance for the future. With the exception of the iron piled by the Iroquois Furnace Co., which has been operating continuously and has therefore accumulated a moderate tonnage, the furnace stocks in this territory have been fairly well

cleaned up. It is reported that nearly 12,000 tons has been moved from the Zenith furnace since the first of the year and that a few hundred tons comprises all that either the Spring Valley, Northwestern, Thomas or Federal furnaces have on hand. With only the one Iroquois, one Sidney and the Inland stack active in the Chicago district, it is apparent that the matter of price, so far as local northern irons is concerned, is practically a closed question. Prices on southern iron are evolved through a juggling of analyses with the result that iron of close to No. 1 grade is selling around $12 which would place No. 2 according to the accustomed spread at $11.50 Birmingham. Some No. 2 has been sold at $11.50, but the kind of iron which makes up the major portion of the tonnage sold brings a better price than that, so that it is generally maintained that there is little No. 2 being sold below $11.75 Birmingham. We quote:

Lake Superior Charcoal	$20.50 to 21.00
Northern Foundry No. 1	17.50 to 18.00
Northern Foundry No. 2	17.00 to 17.50
Northern Foundry No. 3	16.50 to 17.00
Southern Foundry No. 1	16.35 to 16.85
Southern Foundry No. 2	16.35
Southern Foundry No. 3	15.85 to 16.35
Southern Foundry No. 4	15.35 to 15.85
Southern No. 1 Soft	16.35 to 16.85
Southern No. 2 Soft	16.35
Southern Gray Forge	15.35 to 15.85
Southern Mottled	15.10 to 15.60
Southern Silveries, 4 per cent Silicon	17.85 to 18.35
Southern Silveries, 5 per cent Silicon	18.35 to 18.85
Southern Silveries, 6 per cent Silicon	19.35 to 19.85
Jackson Co. Silveries, 6 per cent	18.90 to 19.40
Jackson Co. Silveries, 8 per cent	20.90 to 21.40
Jackson Co. Silveries, 10 per cent	22.90 to 23.40
Malleable Bessemer	17.50 to 18.00
Standard Bessemer	18.40 to 18.90
Alabama Basic	17.35 to 17.85

Billets and Rods.—There is nothing of interest to report concerning either billets or rods. The products demanding billets in their manufacture appear to be well taken care of on old contracts. There is no incentive to test the firmness with which prices are held and we quote for Chicago delivery, rolling billets, $29.50; forging billets, $31.50. We quote f. o. b. Pittsburg, Bessemer wire rods, $35; openhearth, $36 and chain rods, $37.

Merchant Bars.—It is reported that not only are low prices being made on shapes and bars rolled from old steel but that reduced prices on soft steel bars have been encountered by jobbers. The total tonnage of steel bars purchased is small, however, and there is no doubt that the leading producers are holding to schedule absolutely. Specifications on bar iron contracts come in slowly, but there is no new business and the operation of the mills for the most part continues to be intermittent. We quote for mill shipment Chicago delivery as follows:

Bar iron, 1.65c to 1.68c; soft steel bars and bands, 1.78c, half extras; soft steel angles, less than 3 x 3, 1.88c; hoops, 2.18c base, full extras; planished or smooth finished tire steel, 1.98c; iron finish, up to 1½ x ½ inch, 1.93c base tire card; iron finish, 1½ x ½ inch and larger, 1.78c base, steel card; channel for solid rubber tire, ¾ to 1 inch, 2.28c, and 1⅛ inch and larger, 2.18c; smooth finished machinery steel, 2.18c; flat sleigh shoe 1.83c; concave and convex sleigh shoe, 1.93c; cutter shoe, 2.36⅛c; toe calk steel, 2.33c; railway spring, 1.98c; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 56 per cent off the list for carload lots, and 52 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 2.10c, full extras; soft steel bars, $2 per 100 pounds base, plus half extras; soft steel hoops, 2.40c; full extras.

Plates.—With the exception of the interest that attaches to the occasional reports of shading by independent mills on the smaller sizes of plates, the attention of the market interests seems wholly diverted from them. We quote:

Plates, ¼ inch and heavier, 6¼ to 100 inches wide, either universal or sheared, 1.88c to 1.91c Chicago. For extras see Pittsburg report. Jobbers' prices for shipment from local stocks are as follows: Tank steel, ¼ inch and heavier, up to 72 inches wide, 2.10c to 2.20c; from 72 to 96 inches wide, 2.20c to 2.30c; 3/16 inch up to and including 60 inches wide, 2.20c to 2.25c; 72 inches wide, 2.45c to 2.55c; No. 8, up to 60 inches wide, 2.20c to 2.25c. Flange and head quality, 25c extra

Sheets.—The demand for sheets has fallen off decidedly and the tonnage moving is very small indeed. Offers of liberal concessions in prices are reported, but at the same time other shipments from both mill and stock are bringing full prices and it would seem that the shading is occasional rather than the rule. For mill prices see Pittsburg report. We quote for Chicago delivery from store:

No. 10, 2.20c to 2.25c; No. 12, 2.25c to 2.30c; No. 14, 2.30c to 2.35c; No. 16, 2.40c to 2.50c; Nos. 18-20, 2.60c to 2.65c; Nos. 22-24, 2.65c to 2.70c; No. 26, 2.70c to 2.75c; No. 27, 2.75c to 2.80c; No. 28, 2.85c to 2.95c; No. 30, 3.25c. Galvanized sheets, Nos. 10 to 16, 3.05c to 3.15c; Nos. 18 to 20, 3.15c to 3.25c; Nos. 22 to 24, 3.30c to 3.35c; No. 26, 3.50c to 3.55c; No. 27, 3.70c to 3.75c; No. 28, 3.90c to 4.00c; No. 30, 4.40c to 4.50c.

Structural Steel.—The past week has brought to light fewer building contracts than for several weeks past. Two small bridges in California and a like number in Minnesota together with an apartment building in Milwaukee requiring a small number of tons brought in an aggregate of about 600 tons. The contract for new grand stands at the state fair grounds, Cheyenne, Wyoming, was also placed with a contractor who will obtain material from the American Bridge Co.

The Y. M. C. A. building at Portland, Ore., which was first designed as a steel structure, will be built of reinforced concrete. The original plans called for about 1,000 tons of steel, but now scarcely more than one-half that tonnage will be required. The contract for erection was placed with J. R. Bowles. It appears that the Spalding Merrick building may also be built of reinforced concrete and in addition be reduced in height one story. The placing of the contract is being held up pending a settlement of this question. Nimmons & Fellows, Chicago, are the architects. The new work in prospect not previously mentioned includes a new armory at Seattle and government piers and wharf sheds at Fort Mason, San Francisco, which will require about 2,000 tons. There is no doubt that most of the tonnage that has been hanging fire for some time is being withheld in anticipation of better prices and the influence of such low prices as have been made has been to more firmly establish the belief that reductions will be conceded. From reports given out, it is apparent that some of the contracts taken by fabricators lately at low prices were assumed with full anticipation of a reduction in mill prices. It is understood that the buying of plain structurals to fill these contracts has been delayed up to the point where they must be bought and full prices will have to be paid on a part of the tonnage at least despite the narrow margins on which the contracts were taken. It seems probable, therefore, that there will be a less general willingness to take further business at similar prices until reductions shall be made from mill. We quote:

Beams and channels, 3 to 15 inches inclusive, 1.88c to 1.91c delivered Chicago. For extras see Pittsburg report. Quotations from store are as follows for carload lots and over:

All angles, 3 inches and larger, including 6 inches, $2.05 per 100 pounds;

angles, over 6 inches, $2.15 per 100 pounds, base; beams, 3 to 15 inches inclusive, $2.05 per 100 pounds, base; channels, 3 inches and larger, $2.05 per 100 pounds base. Less than carload lots are $1 a ton higher than foregoing prices.

Rails and Track Supplies.—The number of inquiries for small tonnages of rails from the lesser roads was the most encouraging feature of the work. An aggregate of about 3,000 tons was placed and there remains a fair amount which will be placed soon, including one 800-ton lot. The volume of light rail purchases was fair. The Lake Shore road bought a good tonnage of spikes and bolts and the total quantity of fastenings sold during the week was above the average. Aside from the one large order for rails that was placed, the month of April shows a somewhat decreased volume of rail purchases as compared with March. We quote:

Standard rails, $28 f. o. b. mill, full freight to destination; light rails, 25-pound to 45-pound, $28; 20-pound, $29; 16-pound, $30; 12-pound, $31. Track supplies, f. o. b. Joliet, angle bars, 1.65c; spikes, 1.80c to 1.90c; track bolts, with square nuts, 2.30c to 2.40c; with hexagon nuts, 2.45c to 2.50c. Small railroad and square boat spikes, 1.90c base, f. o. b. Pittsburg.

Merchant Pipe and Boiler Tubes.—From store the sale of boiler tubes is nearly a headliner. This is true because of the quick shipment possible from stock and it reflects the character of the buying which is in small lots for shipment yesterday. Otherwise the business is absolutely routine and in meager volume.

We quote mill discounts, Chicago delivery, carload lots, as below. On steel pipe jobbers are allowed a concession of one point and 5 per cent additional from the schedule in force.

	—Steel—	
	Black.	Galv.
¾ to 6 inches, inclusive....	71.2	61.2

BOILER TUBES.

	Steel.	Iron.	Seamless.
2¾ to 5 ins., inclusive..	63.2	50.2	49.2

Mill quotations on iron pipe are five points higher than the foregoing prices.

We have revised our prices from store, as below. A concession of one-half to one point from these prices is allowed by Chicago jobbers on carload orders shipped from local stocks. We quote for less than carload lots as follows:

MERCHANT PIPE.

	Black.	Galv.
⅛ to ¼ inch.....	64	48
⅜ inch	66	52
½ inch	68	56
¾ to 6 inches.....	71	62
7 to 12 inches.....	68	53

Store prices for wrought iron pipe, carload lots, from Chicago stocks, are as follows: One-eighth to ¼-inch, 59; ⅜-inch, 61; ½-inch, 63; ¾-inch to 6 inches, 68; 7 inches to 12 inches, 65. Boiler tubes from store are unchanged as follows:

	Steel.	Iron.	Seamless.
1 to 1½ inches.....	35	35	35
1¾ to 2¼ inches.....	50	35	35
2½ inches	52½	35	35
2¾ to 5 inches.....	60	47½	47½
6 inches and larger.....	50	35	..

Cast Iron Pipe.—The current business coming to the pipe shops is altogether of the small tonnage variety. Of this business, the volume is very good. The number of small towns and cities which are buying pipe is very large and from Oklahoma towns alone the last week brought about 1,000 tons. The contract for 350 tons for Collinsville, Ill., was taken by T. C. Brooks & Son, who will probably obtain their pipe from the leading interest. Prices are erratic and depend almost entirely on the size of pipe and the situation of the bidder as to stock on hand. We quote 4 to 6-inch, $27; 6 to 16-inch, $26; larger size, $25; gas pipe, $1 a ton higher.

Wire Products.—There is very good reason for believing that the major portion of the tonnage of wire products which has been shipped from mills since the first of the year has been taken by the ultimate consumer. This is borne out by the fact that April sales have held up more nearly to the level of March than producers anticipated and in fact have almost equalled the showing of last month. In some sections of limited area, where a local condition of poor crops may have prevailed last fall, as in some of the localities of the northwest, trade has naturally been slow, but this is not true generally. A slight decline has set in in the volume of nails being moved, but a strong demand for barb wire continues. We quote Chicago delivery to jobbers as follows.

Wire nails, $2.23; painted barb wire, $2.38; galvanized barb wire, $2.68; smooth annealed wire, $2.08; smooth galvanized wire, $2.38; polished staples, $2.23; galvanized staples, $2.63. Carload lots to retailers, 5 cents higher; less than carload lots, 15 cents higher.

Coke.—Displaying even less animation than the pig iron market upon which it depends, the coke situation is uniformly dull. Prices have reached a point where the only probable change will be an increase. We quote for standard Connellsville furnace coke, $1.75, and for the same quality in foundry coke, $2.25 at the ovens.

Old Material.—In the few transactions which have appeared during the week, the prices have clearly indicated the general weakness of the scrap market. The single exception to this is, this week as last, rerolling rails. A sale of something less than 2,000 tons of this material to a local rerolling mill brought $13.50 and the indications are for added firmness. The Rock Island system is understood to be offering between 3,000 and 4,000 car wheels at $14 without takers. Cast scrap in particular is entirely lacking in strength and it is apparent that country dealers are well stocked up with material.

Old car wheels.....	13.00 to 13.50
Old iron rails.....	15.00 to 15.50
Re-rolling rails (3 ft. and over)...	13.25 to 13.75
Old steel rails (3 ft. and under)	12.00 to 12.50
Light section relayers, 45 lbs. and under, subject to inspection....	21.00 to 23.00
Relaying rails, subject to inspection	19.00 to 19.50
Frogs, switches and guards.....	11.50 to 12.00
Heavy melting steel.....	11.00 to 11.50

We quote, net tons, as follows:

No. 1 R. R. wrought.....	$11.00 to 11.50
No. 2 R. R. wrought.....	10.00 to 10.50
Knuckles, couplers and springs..	10.50 to 11.00
Shafting	14.00 to 14.50
Iron car axles.....	16.00 to 16.50
Steel car axles.....	15.00 to 15.50
Dealers' forge No. 1.....	9.00 to 9.50
Pipes and flues.....	7.75 to 8.25
No. 1 cast, 150 lbs and less....	11.75 to 12.25
No. 1 mill.....	6.75 to 7.25
Mixed busheling (Nos. 1 and 2).	6.50 to 7.00
Country sheet	5.25 to 5.75
No. 1 boiler cut.....	7.00 to 7.50
Boiler punchings	10.00 to 10.50
Cast borings	4.00 to 4.50
Mixed borings, etc.....	4.00 to 4.50
Machine shop turnings	6.00 to 6.50
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.50 to 10.00
Stove plate and light cast scrap..	9.50 to 10.00
Old iron splice bars.....	13.00 to 13.50

CINCINNATI.

No Improvement in Demand or in Shipments of Pig Iron.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., April 28.

Pig Iron.—A few inquiries have come to light during the week, among which are 2,000 tons from a New England melter, for third and fourth quarter delivery, 500 to 1,000 tons in Chicago territory, 700 tons of malleable from an Ohio melter, 1,000 tons of basic from southern Ohio, 300 tons of foundry iron from Michigan, and 200 tons of high silicon from Illinois. It will be noted that the inquiry in strictly Cincinnati territory is light, and the business of the week has been of about the same proportion as for the preceding four or five weeks. There appears to be no improvement in the demand or shipments. Prices in this market for southern iron continue at $11.75 to $12 Birmingham and for northern iron mainly $15.50 at furnace; although some sales have been made at $15 Ironton district. In this connection it may be noted that in Cincinnati territory there is no local

or southern Ohio iron available at a price low enough to come into competition with the ruling southern iron prices and therefore this market is not subject to the keen competition in markets like Chicago and Cleveland where local irons compete with the southern product and for this reason lower prices are encountered in those districts, on southern iron than can be found here. Low grade irons are comparatively firmer than the better grades and this is accounted for by the light production generally and the purchases by cast iron pipe makers of the low grades, which has practically absorbed the production of gray forge and No. 4, while the light jobbing foundry melt has allowed of an accumulation of the usually desirable grades, such as No. 2 soft and foundry. There is but little doing in basic, but nominal prices are in the valley, $15.50 at furnace in Virginia, $14.50 at furnace and in the south $13 50 Birmingham. High silicon iron remains quotable at $18 50 furnace for Jackson county 8 per cent. We quote for prompt shipment and second quarter delivered Cincinnati, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton as follows:

	PER TON
Southern foundry No. 1	$15.50 to 15.75
Southern foundry No. 2	15.00 to 15.25
Southern foundry No. 3	14.50 to 14.75
Southern foundry No. 4	14.00 to 14.25
Southern No. 1 soft	15 50 to 15.75
Southern No. 2 soft	15.00 to 15.25
Southern gray forge	13.75
Northern No. 1 foundry	16.95 to 17.20
Northern No. 2 foundry	16.45 to 16.70
Northern No. 3 foundry	15.95 to 16.20
Northern 8 per cent silicon	19.70 to 20.20

Finished Material.—Specifications on contracts and demand both from store and for mill orders continue light, but there is no apparent change in prices. One thousand tons of standard section steel rails were sold to an Indiana traction company.

Coke.—Requisitions on contracts continue moderate and the market is quiet with no particular change in prices. An easy tone prevails, and there has been a slight increase in production in some districts. Spot coke is going at irregular figures according to individual situation. Contract prices in the leading coke producing districts are as follows:

	PER TON
Wise county furnace coke	$1.75 to 2.00
Wise county foundry coke	2.25 to 2 35
Pocahontas furnace coke, prompt shipment	1.65 to 1.90
Pocahontas foundry coke	2.00 to 2.25
Connellsville furnace coke, prompt shipment	1.70 to 1.90
Connellsville foundry coke	2.25 to 2.50

Old Material.—The market continues quiet and while in some instances stocks are firmly held the undertone to the market is easy. Demand is light and offerings moderate. We quote dealers' prices here as follows:

Old No. 1 R. R. wrought, net tons	$11.00 to 12.00
Cast machine and fdy., net tons.	12.00 to 12.50
Old iron rails, gross tons	16.50 to 17.50
Old steel rails (re-rolling) gross tons	12.50 to 13.00
Old short lengths, gross tons	12.50 to 13.00
Old iron axles, net tons	16.50 to 17.50
Heavy melting scrap, gross tons	12.00 to 12.50
Stove plate, net tons	9.50 to 10.50
Wrought turnings	5.50 to 6.50
Cast borings, net tons	4 50 to 5.50
Car wheels, gross tons	16.50 to 17.50

The John J. Bruce Foundry Co. of Cincinnati took off the last heat in its old foundry on April 25, and is now moving to its new plant on Colerain avenue.

PHILADELPHIA.

Dullness Rules in All Lines, But There Is Some Optimism.

Office of THE IRON TRADE REVIEW,
408 Central Trust Bldg., April 28.

Pig Iron.—If the darkest hour is just before the dawn in the iron and steel trade, as it is said to be in nature, the long-looked-for improvement must be near at hand. Certain it is that in all lines extreme dullness rules, and less is being done than in the depressed days of December and January. Few sales of pig iron are reported, even at the concessions offered by southern furnaces, which continue to take the greater part of the little business offering. A local pipe founder is understood to be in the market for 5,000 tons, which it is supposed will go to some southern interest. Despite the extreme dullness the furnaces that have agreed to maintain prices continue to do so, and are booking small orders right along. Quiet as the situation is, there is a pronounced feeling of optimism, especially among those whose knowledge of the trade runs back a quarter of a century or more and who have seen many such setbacks. The brilliant success of the Pennsylvania railroad's $40,000,000 loan and of Philadelphia's smaller offering of $5,750,000 shows that there is plenty of unemployed money in the country, and if this can be brought into play and the railroads be given a chance to finance their improvements, a change for the better is bound to follow. This is the silver lining to the cloud, which is expected to roll away soon, and this is the feeling that leads experienced furnace men to refuse to cut prices to such a figure that heavy losses must follow. The following quotations show the scheduled prices and the Philadelphia delivery figures of Virginia and Birmingham irons in which the freight charges are, respectively, $3.25 and $4.20:

No. 1X foundry	$18.75 to 19.25
No. 2X foundry	18,25 to 18.50
No. 2 plain	17.75 to 18.00
Standard gray forge	16.50 to 16.75
Basic	17.25 to 17.50
Low phosphorus	23.50 to 24.00
No. 2 Birmingham	15.70 to 16.20
No. 2 Virginia	17.50 to 18.00

Finished Materials.—There is comparatively little new business coming to the mills in this vicinity. The bridge department of the Pencoyd works of the American Bridge Co., which managed to keep fairly busy through the winter, is now practically closed, and the structural material department is busy to only about one-quarter of its capacity. The same ratio holds for other plants, which report things even duller than in the winter. The Baldwin Locomotive Works, which now employ about 6,000 men, as against over 20,000 last year, are now closed all day on Thursday—a very unusual thing for them. Prices show no change, as it is generally recognized that nothing would be gained by cutting, and may be quoted as follows: Structural material, 1.85c to 2c, according to specification; plates, 1.85c to 1.90c; steel bars, 1.75c to 1.80c; refined iron bars, 1.65c.

Old Material.—The scrap market shows no improvement, and the mills are buying very little. Possibly the reduction in pig iron prices has something to do with this. A few declines are noted in the following quotations:

Old steel rails	$14.75 to 15.25
No. 1 steel scrap	12.75 to 13.25
Old steel axles	17.00 to 17.50
Old iron axles	19.50 to 20.00
Old iron rails	16.50 to 17.00
Old car wheels	13.50 to 14.00
Choice scrap R. R. No. 1 wrought	15.25 to 15.75
No. 1 yard scrap	12.00 to 12.50
Machinery scrap	13.50 to 14.00
Low Phosphorus scrap	17.50 to 18.00
Wrought iron pipe	11.00 to 11.50
No. 1 forge fire scrap	10.50 to 11.00
No. 2 forge fire scrap, ordinary	8.50 to 9.00
Wrought turnings	9.00 to 9.50
Axle turnings, heavy	10.50 to 11.00
Cast borings	8.00 to 8.50
Stove plates	11.00 to 11.50

NEW YORK.

More Structural Contracts Developing —Pig Iron Depressed.

Office of THE IRON TRADE REVIEW.
Room 1005, No. 90 West St., April 28.

Pig Iron.—Whatever improvement the market has made of late in the way of increased inquiry and more widespread selling has been ended for the present through the vigorous circulation, during the past week, of rumors that the situation is approaching a break and that considerably lower prices are being made. For some time, there had been a slight, but steady increase in the number of transactions, evidencing the fact that stocks carried over from last year had finally been used up and that the foundrymen had gathered enough confidence in the outlook to contract for two or three

months in advance. The circulation of bear reports, whether with foundation or not, had the effect of frightening prospective customers into further delay, and the local market is now thoroughly quiet. There is one inquiry out for 1,000 tons of No. 2 foundry for Chicago delivery, but its closing is dependent upon the inquirer taking some prospective business. Several important tonnages which have been pending for a considerable time are still unlet and current business is confined to extremely small lots. There have been sales of southern iron in this territory during the week at $12, Birmingham, and the largest seller in that district is refusing all tenders below that figure, yet there are persistent rumors that this is being shaded considerably. The same conditions are true of Virginia iron, sales of which are being made at $14, furnace. Little is doing in northern iron and quotations, at tidewater, New York, are largely nominal, as follows:

Northern foundry No. 1	$18.00 to 18.50
No. 2X foundry	17.50 to 18.00
No. 2 plain	17.00 to 17.50
No. 2 southern foundry	16.00 to 16.50
Malleable	17.75 to 18.25
Basic	17.00 to 17.50
Gray forge	16.50 to 17.00

Ferro-Manganese.—There is a good run of small orders and some fair sales are being made at the level of $43, seaboard.

Finished Materials.—Belated spring business is now coming out in good volume and structural concerns are figuring on more undertakings than for a long time past, but these projects are still slow in closing. The union depot project at Ft. Garry, Winnipeg, for which a New York firm is architect, has been delayed and no award is likely for a couple of weeks. About 2,500 tons of steel will be required. The leading structural interest is figuring on twice as much tonnage as six weeks ago and there are indications that several jobs which have been hanging fire for some time will shortly be let, among them the Eno hotel building and the first section of the Grand Central freight building. A higher price is being asked on erected work. The increasing easiness of railroad financial conditions is expected to result in some good work in that line during the late spring. The outlook is distinctly more favorable.

The Long Island waterworks project, which will involve a huge tonnage of plates for pipe line purposes, has apparently gone over for the present. The Standard Oil Co. is asking prices on an assorted lot of about 1,500 tons of plates for tank work in connection with construction work at Bayway and intimates that the standard price on this material is not interesting. Some little business is coming out in bar iron and it is pretty generally admitted that in a few cases mills are conniving with brokers to shade the established figures. In cast iron pipe, business is at a standstill. No sales of billets are reported.

Angles, 3 to 6 inches x ¼ inch and heavier, 1.86c; beams, 3 to 15 inches, 1.86c; tees, 3 x ¼ inch and heavier, 1.91c; plates, carloads, tanks, 1.86c; marine boilers, 2.26c; bar iron, 1.56c; soft steel bars, 1.76c; sheets, No. 28, black, 2.66c.

Old Materials.—The market is featureless, with actual transactions so few that quotations are largely nominal. Each transaction is making its own market. We quote gross tons, New York delivery, as follows:

Old iron rails	$15.50 to 16.00
Old steel rails, re-rolling	14.50 to 15.00
Relaying rails	20.00 to 21.00
Old car wheels	14.00 to 14.50
Old iron car axles	17.00 to 17.50
Old steel car axles	15.50 to 16.00
Heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	13.00 to 13.50
Iron track scrap	11.50 to 12.00
Wrought pipe	9.00 to 9.50
Cast borings	5.00 to 5.50
Wrought turnings	7.50 to 8.00
Heavy cast scrap	13.00 to 13.50
Railroad malleable	11.00 to 11.50
Agricultural malleable	10.00 to 10.50
Stove plate	9.50 to 10.00
Grate bars	9.50 to 10.00

BUFFALO.

Sheet Piling Driving Continues—Pig Market Dull.

Office of THE IRON TRADE REVIEW, 932 Ellicott Square, April 28.

Pig Iron.—The situation remains virtually the same so far as local conditions are concerned. Practically the only item of news is that A furnace of the Tonawanda Iron & Steel Co. is to be blown out as soon as possible for relining and repairs. B furnace will be kept running. There is some speculation as to the probable effect of rumored lower prices for southern iron, but it is thought that they cannot change the local situation materilly. The demand is light and, so far as can be judged, is dwindling. To attempt to state the volume of business of April would be to express it in fractions of that of March, which in turn might be compared with February and so on, an amusing, though somewhat unprofitable, proceeding. There is no change in prices to be noted. We quote as follows:

No. IX foundry	$16.80 to 17.30
No. 2X foundry	16.30 to 16.80
No. 2 plain	15.80 to 16.30
No. 3 foundry	15.30 to 15.80
Malleable Bessemer	16.50 to 17.00
Gray forge	15.00 to 15.50
Charcoal	21.00 to 21.50

Finished Materials.—The market is quiet. There is some good business pending, but it is contingent on conditions as to its development.

The MacArthur Bros. Co. has about completed the driving of the 100 tons of sheet piling furnished by the Lackawanna Steel Co. for test, preparatory to selecting the piling to be used in the Black Rock harbor improvement work. Though it is the first time that the Lackawanna piling has been used, it has so far given entire satisfaction in driving. One hundred tons each of the United States and Friestedt channel bar sheet pilings of the Carnegie Steel Co. and the Harold sheet piling of the Jones & Laughlin Co. are to follow. The pilings are being driven in pockets and will be pumped out and subjected to water pressure similar to those which they will be under when the coffer dam is completed. As soon as the tests are finished and a selection made, one or more pile drivers will be added, so that the driving of the 6,900 tons necessary for the work may be accomplished by Oct. 1, 1908.

ST. LOUIS.

Interest in Steel Barge Line and New Buildings.

April 27.

Pig Iron.—The conditions of the pig iron market in the St. Louis territory at the close of last week remained practically the same as reported for the previous week, except a slight shading in prices of southern iron, which is now quoted freely at $11.75 to $12.25, Birmingham, for No. 2. Stocks on foundry yards are lower than they have been for a long time, and buyers are waiting until prices reach bottom, when a large tonnage is expected to be contracted for. Inquiries were received covering all deliveries, and some buying was done, but mostly for immediate shipment. The melters are taking iron in a satisfactory manner. Our quotations f. o. b. St. Louis, the freight rate from Birmingham being $3.75, follow.

No. 1 southern	$16.25 to 16.75
No. 2 southern	15.75 to 16.25
No. 3 southern	15.25 to 15.75
No. 4 southern	14.75 to 15.25

Coke.—Shipments of coke last week slightly increased in line with the increased melt of the foundries, but prices remained about the same as quoted for the previous week. One concern closed a sale Friday and Saturday for 2,000 tons of Virginia foundry coke, delivery to begin July 1 and extend over a period of 12 months. Connellsville 72-hour foundry, best selected, was offered at from $2.15 to $2.65, ovens, some spot coke being offered as low as $2, but the grade was not of the best. Connellsville 48-hour

coke was quoted at $1.40 to $2, ovens. Best selected Virginia, 72-hour, $2.25 to $2.50, and 48-hour Virginia furnace coke at $1.75 to $2, ovens. The freight rate from Connellsville and the Virginia fields is $2.80 to East St. Louis, $2.90 to St. Louis, and $2.40 when destined beyond.

Finished Material.—Several building projects and the prospect of a steel barge line, costing $2,000,000, between St. Louis and New Orleans, awakened considerable interest last week. The barge line, if constructed, is to be financed by the St. Louis Merchants' Exchange. A meeting of the exchange members was held last Tuesday and a permanent organization to further the project was effected.

Plans for the erection of a $300,000 warehouse at the northeast corner of Delmar and Bayard avenues, in the western portion of the city, have almost been completed by E. Ross Chamblin, architect, 1014 Holland building. The building will be 12 stories high, fireproof, and will have a ground area of 120 x 167 feet. It will be ready for occupancy on April 1, 1909. Legal complications that have retarded work on the LaSalle building, northwest corner Broadway and Olive street, for about a year, were settled in court last week, and operations will be begun at once. The building will be an 18-story office structure. Its builder, the LaSalle Investment Co., is capitalized at $1,000,000. The St. Regis, an apartment building, requiring 750 tons of steel, will also be erected on King's Highway.

Old Material.—While the market still is dull, some improvement was noticed last week in the shape of orders. Our quotations follow:

Cast iron borings, free from foreign material, net ton	$ 4.50
Steel axle turnings, net ton	8.00
Steel railroad axles, net ton	13.50 to 14.00
Iron railroad axles, net ton	15.50
Miscellaneous steel scrap, gross ton	10.25
Old car wheels, gross ton	14.00 to 14.50
No. 1 railroad cast scrap, net ton	11.00
Heavy machinery cast, net ton	12.00
Stove plate and light cast, net ton	10.00
Sheet iron, net ton, uncut	3.50
No. 1 railroad wrought, net ton	10.50 to 11.00
Railroad malleable, net ton	11.50
Heavy melting steel, net ton	10.00

The offices of the Steel Corporation subsidiaries in St. Louis, after May 1, will be in the new Third National Bank building, Broadway and Olive street. The American Sheet & Tin Plate Co. and the National Tube Co. will occupy the sixteenth floor of the building, and on the fifteenth floor the Carnegie Steel Co., Illinois Steel Co., Lorain Steel Co., Tennessee Coal, Iron & Railroad Co., the American Steel & Wire Co. and the American Bridge Co. will have offices. The present quarters are in the Chemical building.

BIRMINGHAM.

Bidding in Export Business in Pig Iron.

April 27.

Alabama iron makers are bidding on considerable export business. It is learned that efforts are being made to locate some healthy orders for No. 3 foundry iron to be shipped across the ocean. It is confidently believed that some of the bidding for foreign business will result in orders being received. The foreign market is said to almost, if not entirely equal, the domestic market.

The make at present is the same as it has been for the past two weeks. The make for April may be equal to the output of March, though in some quarters some doubt is expressed thereon. All shipments are prompt.

CLEVELAND.

Iron Ore Sold—Pig Iron Dull at Low Quotations.

Office of THE IRON TRADE REVIEW,
Browning Bldg., April 28.

Iron Ore.—A block of 50,000 tons of ore has been sold to a southern Ohio furnace interest. This is the first sale made for shipment after May 1, and it was closed at the regular agreed prices. It is not expected that there will be any general buying for some time to come, but ore men are urging the importance of the furnaces deciding at some time in the not far distant future as to the probable tonnage of ore which will be required. Very little mining has been done on the ranges during the winter, and arrangements have been made for a greatly curtailed production. In the not impossible eventuality of strong opposition to the open shop principle developing late in the season, ore shipments may be greatly curtailed, and hence the ore men believe that wisdom dictates that furnace men should soon make an estimate of their requirements. Ore interests show no disposition to waver from their determination to ask the same prices this year as prevailed last year. They say that in past years they have always adhered to announced prices, and that they do not intend to change their practice this year and thereby lose their reputation for firm adherence to an announced policy. On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $5; Mesabi Bessemer, $4.75c; old range non-Bessemer, $4.20, and Mesabi non-Bessemer, $4.

Pig Iron.—Very few sales are being made and there is little inquiry, but most furnaces report that prompt delivery is asked on nearly all iron recently purchased. There is considerable irregularity in prices, which range from $15 to $15.25 for No. 1 valley, and $14.75 to $15 for No. 2. The usual differential of 50 cents does not generally prevail. In the case of 1,000 tons which was sold last week to a Cleveland foundry at $15 valley, the seller states that the iron was not No. 1, as the silicon guarantee was no better than for No. 2. In recent sales, however, the sellers have shown considerable liberality in not adhering to the usual grade analyses. For Cleveland delivery we quote as follows:

Bessemer	$17.00 to 17.35
No. 1 foundry	15.90 to 16.15
No. 2 foundry	15.65 to 15.90
No. 3 foundry	15.15 to 15.50
No. 2 southern	15.85 to 16.00
Gray forge	13.50 to 14.00
Lake Superior charcoal	20.00 to 21.00

Coke.—There are practically no transactions in furnace coke and very few in foundry grades. For standard furnace coke we quote $1.60 to $1.70 at the ovens, and for high grade foundry coke, $2 to $2.25.

Finished Material.—Bar iron manufacturers have reaffirmed the quotation of 1.50c, and prices are pretty well miantained, although there is very little business being done. The settlement of the seven years' street railway war in Cleveland is expected to be followed by considerable improvement in the city lines. About the first inquiry expected is for 1,500 tons of steel rails for the Superior avenue line. Work has been begun by a carpet firm on a building which will require 1,500 tons of structural material, on which bids are soon to be submitted. Competition from rollers is not so active as it was recently.

Old Material.—The closing of large lists by two of the larger railroad companies passing through Cleveland the latter part of the week, caused another sag in the market. Further offerings by dealers in this locality, as well as by the railroads whose lists had closed but had more material to offer, put the local market in such shape that it is difficult to arrive at anything but a nominal price for either wrought or cast material. Cast material especially seems to have been the more greatly affected. Local mills as well as mills in this locality are buying practically no scrap, and the few transactions recorded are almost altogether

between dealers. A number of changes have been made in the price list, f. o. b. Cleveland, which is still almost altogether nominal:

Old iron rails	$14.50 to 15.00
Old steel rails (re-rolling)	12.50 to 13.00
Old steel rails (under 6 ft.)	12.00 to 12.50
Old car wheels	12.50 to 13.00
Old steel boiler plate	9.00 to 10.00
Steel axles	14.50 to 15.00
Malleable iron (railroad)	12.50 to 13.00
Malleable iron (agricultural)	10.00 to 10.50
Heavy steel	11.00 to 11 50
Country mixed steel	10.00 to 10.50
Low phosphorus	13.00 to 13.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$11 50 to 12.00
No. 1 busheling	10.00 to 10.50
No. 1 machine cast	11.00 to 12.00
Iron axles	16.00 to 17.00
Axle turnings	7.00 to 7.50
Machine shop turnings	5.50 to 6.00
Grate bars	9.00 to 10.00
Pipes and flues	9.00 to 10.00
Tank iron	8.25 to 9.25
Hoop and band iron	5.25 to 6.25
Sheet iron	4.25 to 5.25
Wrought drillings	5.50 to 6.00
Stove plate	9.50 to 10.00
Cast borings	4.50 to 5.50

METAL MARKET

NEW YORK.

April 28.

Copper.—Throughout the week the market has manifested but slight activity and there is now considerable pressure to sell, with the result that the market is weaker in tone. We quote: Lake, 12⅝c to 12⅞c; electrolytic, 12½c to 12¾c; casting, 12¼c to 12½c.

Pig Tin.—Metal for early shipment is at a lower premium and the situation is not so strong. The current level is 31.45c to 31.50c.

Pig Lead.—The situation is firm, though business is light, and we quote New York delivery at 3.97½c to 4.02½c.

Spelter.—Business is light and prices manifest little change, holding firm at about 4.60c to 4.65c, New York.

Antimony.—The situation has improved, because of recent heavy sales. We quote: Cookson's, 9c to 9½c; Hallett's, 8½c to 8¾c; ordinary brands, 8½c to 8¾c.

CHICAGO.

April 28.

In the small quantities which make up all of the metal trade in this market at present, the activity has been too slight to establish prices. We quote as follows:

Lake copper, 13¾c to 14c; casting, 13¼c to 13½c; pig tin, 34c to 34½c; spelter, 5 20c to 5.25c; pig lead, desilverized, 4.20c to 4.30c in 50-ton lots; corroding, 4.70c to 4.80c in 50-ton lots; car lots, 2½c per 100 pounds higher; sheet zinc, 7c list, f. o. b. LaSalle, in car lots of 600-pound casks; Cookson's antimony, 12½c to 13c; other grades, 12c to 12½c.

An erratic interest in the scrap metals was in evidence but inquiry is much too dull to be at all satisfactory. We quote to dealers as follows:

Copper wire, 10¾c; heavy copper, 10¾c; light copper, 10¼c; heavy red brass, 10¼c; heavy yellow brass, 8¼c; light brass, 6c; No. 1 red brass borings, 8½c; No. 1 yellow brass borings, 7c; brass clippings, 8c; tea lead, 3c; lead scrap, 3¼c; zinc, 3⅛c; tin pipe, 26c; tin foil, 22c; pewter, 17c; electrotype plates, free from wood, 3¾c; electrotype dross, 2½c; sterotype plates, 4¼c; stereotype dross, 2⅞c; prime slab zinc dross, $52 per ton.

ST. LOUIS.

April 27.

Lead and Zinc.—The highest price paid for zinc in the Joplin district last week was $39 a ton on an assay base price of $36 a ton of 60 per cent zinc, ranging down to $34 base. Lead reached a top price of $55 a ton.

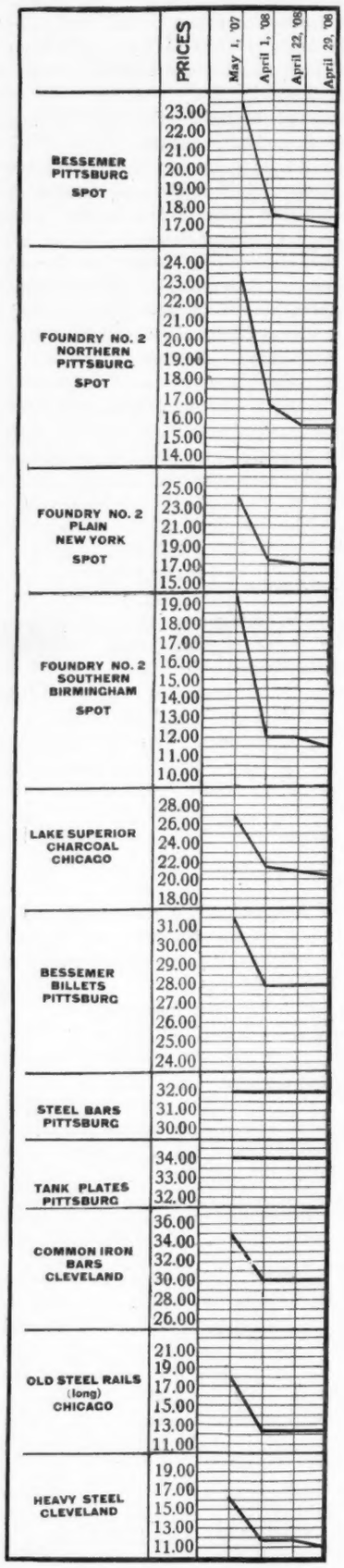
With a strike on at the smelters of the Edgar Zinc Co., at Cherryvale, Kas., the company continued to purchase ore, and this with an increased demand from other smelters, brought competition to a high tension. The increased demand came at a time when quite a number of mines were flooded because of heavy rains and when the normal output of March was greatly reduced and every pound of the production taken up each week. The shipments last week, owing to a light production, were decreased 850 tons.

The St. Louis Smelting & Refining Co. continued to lead in the purchase of lead ore, taking fully 60 per cent of the output last week and leaving the local smelters to scramble for the remainder of the output and at very strong prices.

The Iron City Steel Co., with offices in the Bessemer building, Pittsburg, has taken the exclusive agency in the Pittsburg district of the Interstate Iron & Steel Co., Cambridge, O., and will handle all the products of that mill. C. H. Daker will be in charge of the selling activities. The Iron City Steel Co. is about to move into more commodious quarters at 717, 718 and 719 Bessemer building.

The Shenango Furnace Co. is putting the finishing touches upon its new No. 1 stack at Sharpsville, Pa., by the construction of a Brown skip hoist and ore bins, making it a mechanically-filled stack.

PRICE CHART.



PERSONAL.

C. A. Clarke, of Hill, Clarke & Co., Boston, has sailed for a six weeks' European trip. He will visit England, France, Germany, Sweden, and probably Russia.

Wm. E. Corey, president of the United States Steel Corporation, sails Thursday on the Deutschland for France.

J. I. Andrews, assistant general manager of sales of the American Sheet & Tin Plate Co., is confined to his residence in Pittsburg by a severe attack of rheumatism.

Joseph Bishop, Columbus, O., has been reappointed a member of the state board of arbitration, by Governor Harris. Mr. Bishop was first appointed by Governor William McKinley, when the board was first established, and he has served continuously from that time.

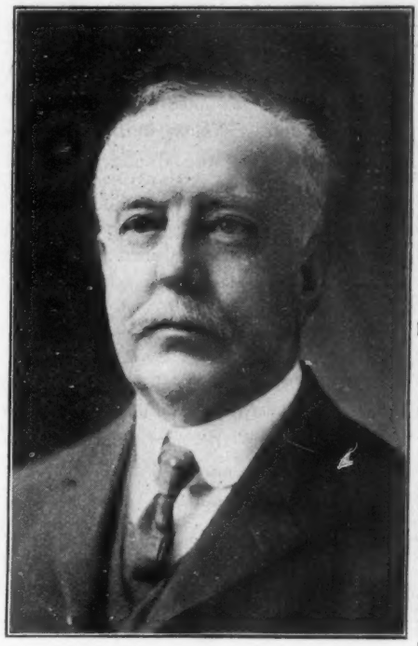
E. W. Word, for the past two and a half years connected with the Crucible Steel Co. of America, Pittsburg, has resigned his position with that company, to take effect May 1. After taking a short rest, it is the intention of Mr. Word to engage in business in the far west, the nature of which he is not yet at liberty to make public.

William E. Dodds, for many years with the Edward P. Allis Co. and later the head of the engine department at the Allis-Chalmers plant, has been elected general manager of the Standard Cast Iron Pipe & Foundry Co., Philadelphia. The corporation has a capital of $2,000,000 and at the present time is constructing a large plant on the Delaware river at Philadelphia.

William Wuthenow, formerly superintendent of the Birmingham, Ala., plant of the Republic Iron & Steel Co., has been elected superintendent of the plant of the United Steel Co., at Canton, O. He had been with the Republic Iron & Steel Co. for the past 20 years. Mr. Wuthenow succeeds J. P. Shaddick, who will locate at Holyoke, Mass.

OBITUARY.

Eben H. Bourne, one of the best known business men of Cleveland for more than 40 years, died from paralysis, April 24, aged 67 years. He organized and became the head of the firm of Bourne, Damon & Knowles, manufacturers in 1866, which, in 1881, changed to the present Bourne & Knowles Mfg. Co., manufacturer of bolts, rivets, etc. He was also interested in the iron and steel jobbing concern, Bourne-Fuller Co., of which he was one of the directors. From 1868 to 1888 he was president of the Cleveland Spring Co., and from 1883 to 1893, of the Columbia Spring Co. Upon the death of Senator M. A. Hanna, Mr. Bourne was elected his successor as president of the Union National Bank, having been cashier of the bank for 20 years.



EBEN H. BOURNE.

Mr. Bourne was born in Wareham, Mass., Oct. 22, 1840. His business life began in the service of the Cape Cod Railroad Co., and when it became merged in the Old Colony railroad, Mr. Bourne was assistant treasurer for some time. In 1866 he removed to Cleveland. Two sons, Richard and Herbert, survive with their mother. Both sons are connected with the Bourne-Fuller Co.

Thomas L. Woodmancy, formerly a stockholder and sales manager of the Miller Steel Range Co., Cincinnati, died April 21, at Norwalk, O.

Joseph Fleming, a retired boiler manufacturer of Philadelphia, died April 23, at the age of 82. He was in this business at Philadelphia and at Lansdale.

William F. Lindsay, aged 51 years, died at Pittsburg, April 2. For some years he was purchasing agent for the Westinghouse Electric Co. He organized the Frick & Lindsay Co., and at the time of his death was owner of the Globe Mfg. Co., Pittsburg.

William W. Nichols, ex-superintendent of foundry work at the Charlestown navy yard, died April 26 at his home in Brookline, Mass., at the age of 88. During the civil war he fitted out the vessel which afterward became famous as the Monitor.

Norman Curtis Daniels died at Milwaukee, April 1, aged 82 years. In 1861, while in the employ of the Milwaukee & La Crosse railroad, Mr. Daniels superintended the first successful cold sawing of rails in the company's shops at Watertown, Wis. In 1887 he became superintendent of the company's shops at Milwaukee.

D. A. Ralstone, vice president of the Chaplin-Fulton Mfg. Co., Pittsburg, brass founders, died suddenly at his home in Kitanning, Pa., April 24. He was 71 years of age.

Abram Reese, member of the Reese family noted in the development of iron and steel and other industries in western Pennsylvania and an inventor of prominence, died at his home in Pittsburg, April 25, aged 79 years.

Irving Hodgson Long, eldest son of George J. Long, vice president and resident manager of the United States Cast Iron Pipe & Foundry Co., at Louisville, Ky., died of pneumonia, April 26, at his home in that city. Mr. Long was 26 years old, and had recently been appointed superintendent of the Ninth street foundry of the company at Louisville.

Francis Russell Marble, one of the best known manufacturers of textile machinery in New England, died at his home in Worcester, Mass., April 11, in his 75th year. He went to Worcester in 1841; worked on a farm until 1852, then learned the machinist trade, working in the shop of Thayer, Houghton & Co. until 1863. He assisted in forming the firm of Curtis & Marble, for which he acted as superintendent until 1889 when failing health compelled his resignation. The company is now doing business under the name of Curtis & Marble Machine Co.

Jesse J. Cassiday, editor of the *Canadian Manufacturer*, died in Toronto, April 23, aged 75 years. He had been in ill-health for some time. Mr. Cassiday was for many years secretary of the Canadian Manufacturers' Association and was a recognized authority on tariff matters and legislation bearing on industrial development. He was a native of Wilmington, N. C.

The Boston News Bureau figures the production of copper in the United States, Mexico and Canada for March at 73,105,704 pounds, a decrease as compared with March of last year of 23,389,562 pounds.

THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades

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April 30, 1908.

THE PLAN TO PREVENT MERCILESS COMPETITION AND BANKRUPTCY.

We take pleasure in publishing, on page 813 of this issue, two letters in which highly esteemed subscribers express disagreement with some parts of an editorial entitled "Shall We Have Regulated Competition, or Ruinous Trade Warfare?" published in THE IRON TRADE REVIEW of April 9. We see no reason for retracting any statement that we made at that time; in fact, we are even more firmly convinced now, than we were a few weeks ago, of the justice of our position. We said then: "In any attempt at regulation, whether by government or by co-operation of individuals, some injustice will result. Although we are thoroughly in sympathy with the present effort of manufacturers to prevent the ruinous policies of the past, we are entirely willing to admit that there may be ground for just criticism concerning some of the prices that are being maintained. For the sake of the argument, we are willing to admit that the present prices of billets and of some other products are too high, as compared with still other products." We also said in the editorial referred to that we did not believe that any good would be accomplished by discussing various prices in detail, and hence we shall not attempt to reply in detail to the arguments of our correspondents. We wish to say, however, concerning the doubt expressed as to whether a large majority of the furnace interests opposed a reduction in the price of ore, that there is no foundation for such doubt. It is entirely probable that as present stock of ore is used up, some owners of furnaces will advocate a revision of prices, but there is absolutely no question about the fact that a large majority of furnace owners did very emphatically oppose lowering of prices last February, when the meeting of ore interests was held and 1907 prices were reaffirmed.

As to the contentions of our correspondents, there are none which were not considered in the conferences at which the policy of maintaining prices was decided upon, but some of the points are meritorious. The leading iron and steel manufacturers of the country are harmoniously working for the restoration of normal business. When business is restored, complaints will cease and there will be general approval of the present policy. The manufacturers are working for the good of the industry at large. Some interests are bound to be injured in every business policy of general nature which is adopted. Some are undoubtedly suffering by reason of the upholding of prices, and this is to be regretted; but the trade at large is being benefited, even more than can generally be appreciated, by the prevention of the ruinous warfare which marked other panics. The benefit which is accruing to the whole industry is many, many times greater than the injury being done, incidentally, to a few concerns here and there, and even these concerns will profit in the long run by the earlier return of normal activities, and the absence, in the meantime, of thoroughly disorganized conditions. The manufacturing trade at large, the jobbers and the broad-minded retail dealers in iron and steel products, are very generally in sympathy with the price maintenance movement. The plan is working out slowly, and except as to pig iron, is succeeding, and the benefit to the industry will be tremendous in the long run. A keen observer of business conditions said to the writer a few days ago: "I am firmly of the opinion that if it had not been for this movement of the manufacturers to prevent merciless competition, this country would have seen this year more disastrous bankruptcies than ever before in its history."

THE NEW DIRECTORY TO THE IRON AND STEEL WORKS.

After an interval of nearly four years, a new edition of the Iron and Steel Works Directory appears. The character and scope of this authoritative work is so well known that it is a reflex action immediately to accept it as an exact picture of the physical condition of the American iron and steel industry on the date it is published, a photograph reproducing with mechanical accuracy and fairness the physical conditions which exist. A review of this work, therefore, sees through it to the American iron and steel industry and at once seizes the opportunity to discuss its wonderful changes, development and expansion. It makes the comparison with the last time a picture of the industry was furnished in August, 1904, through the 16th edition, and with the earlier pictures furnished nearly half a century ago.

The first directory was published in 1859, by the American Iron and Steel Association, and compiled by Prof. J. P. Leslie. In the middle 60's, another, but not complete, list of the iron and steel works was published. Upon the accession of James M. Swank to the secretaryship, a new directory was published, Sept. 1, 1874, just a third of a century ago.

This little old directory of a third of a century ago is a paper back affair of 106 pages, but the pages and the type are exactly the same as in the present directory. It was the first Mr. Swank compiled and he has compiled all the editions since. No wonder this book is popularly referred to as "Swank's Directory." Not often does one man conduct a work of such importance for a third of a century. Mr. Swank has, of course, been ably assisted, as he has often very graciously stated, and he tells us in the preface of the 17th edition that, in its preparation, the services of four experienced clerks have been constantly engaged for 18 months. To Wm. G. Gray, who for so many years has been the efficient statistician of the American Iron and Steel Association, special credit is due for his work upon the directory.

More extended mention of changes of the past four years, as shown by the directory, will be made in these columns next week.

As a whole, the work is a masterpiece, reflecting great credit upon all who were connected with the tremendous task. As one scans its pages, the words of Carnegie to THE IRON TRADE REVIEW last January, "IRON AND STEEL OWE AN UNPAYABLE DEBT TO SWANK," are again and again recalled. The new volume has certainly added to that indebtednes.

MILWAUKEE STRIKE ENDED.

The Milwaukee members of the iron molders' union who went on strike May 1, 1906, declared off the strike April 23 last. On that date, they received notice that they would not be paid strike benefits any further by the national union after May 5. Thereupon they declared off the strike. The National Founders' Association is authority for the statement that it is not likely that any of these strikers can be given positions soon by the proprietors, whose firm intention it is to care first for the interests of the independent men, many of whom are now idle.

The failure of the iron molders' union to carry its point in Milwaukee marks the final chapter in a long list of defeats suffered by that organization of late. The Milwaukee strike was by far the largest of that craft, in that it involved the most men and the most plants, that has taken place in a single city in many years.

OLD OFFICERS

Re-Elected by Steel Corporation—Quarterly Statement of Earnings.

At the directors' meeting of the United States Steel Corporation, April 28, the following officers were elected: Chairman, Elbert H. Gary; president, Wm. E. Corey; first vice president, Jas. Gayley; second vice president, William B. Dickson; general counsel, Francis Lynde Stetson; secretary and treasurer, Richard Trimble; comptroller, William J. Filbert. Judge Gary was elected chairman of the board of directors, and a member and also chairman of the finance committee. George F. Baker was elected a member of the finance committee. J. P. Morgan & Co. were appointed fiscal agents. The directors also declared the quarterly dividend of 1¾ per cent on the preferred stock and one-half of 1 per cent on the common stock, both unchanged from the last previous quarter. The accompanying statement of the United States March 31, 1908.

EARNINGS.

January, 1908	$5,052,743	
February, 1908	5,709.428	
March, 1908	7,466,834	
Total earnings after deducting all expenses incident to operations, including those for ordinary repairs and maintenance of plants, and interest on bonds and fixed charges of the subsidiary companies		$18,229,005
Less, charges and appropriations for the following purposes, viz.:		
Sinking funds on bonds of subsidiary companies	$ 291,518	
Depreciation and reserve funds	1,771,227	
		2,062,745
Net earnings		$16,166,260
Deduct:		
Interest for the quarter on United States Steel Corporation bonds outstanding	$6,000,987	
Sinking funds for the quarter on United States Steel Corporation Bonds, viz.:		
Installments	$1,012,500	
Interest on bonds in sinking funds	298,476	
	1,310,976	
		7,311,963
Balance		$ 8,854,297
Dividends for the quarter on stock of the United States Steel Corporation, viz.:*		
Preferred, 1¾ per cent	$6,304,919	
Common, ½ per cent	2,541,513	
		8,846,432
Surplus for the quarter		$ 7,865

W. J. FILBERT, Comptroller.

*Dividends payable: Preferred, June 1, 1908; books close May 6, open June 2. Common, June 30, 1908; books close June 10, open July 1.

UNFILLED ORDERS ON HAND.

March 31, 1908..... 3,765,343 tons.

The following table gives the unfilled tonnage at the close of each quarter and the net earnings of the United States Steel Corporation from June 30, 1902, to Sept. 30, 1907, inclusive:

Quarter ended—	Unfilled Tonnage.	Net Earnings.
March 31, 1908	3,765,343	$18,229,005
Dec. 31, 1907	4,624,553	32,553,995
Sept. 30, 1907	6,425,008	43,804,285
June 30, 1907	7,603,878	45,503,705
March 31, 1907	8,043,858	39,122,492
Dec. 31, 1906	8,489,718	41,750,125
Sept. 30, 1906	7,936,884	38,114,624
June 30, 1906	6,809,589	40,125,032
March 31, 1906	7,018,712	36,634,490
Dec. 31, 1905	7,605,086	35,216,063
Sept. 30, 1905	5,865,377	31,240,582
June 30, 1905	4,829,655	30,305,116
March 31, 1905	5,579,560	23,025,895
Dec. 31, 1904	4,696,203	21,466,631
Sept. 30, 1904	3,027,436	18,773,932
June 30, 1904	3,192,277	19,490,725
March 31, 1904	4,136,961	13,445,231
Dec. 31, 1903	3,215,123	15,037,181
Sept. 30, 1903	3,278,742	32,422,954
June 30, 1903	4,666,578	36,642,308
March 31, 1903	5,410,719	25,068,707
Dec. 31, 1902	5,347,523	31,985,759
Sept. 30, 1902	4,843,007	36,945,488
June 30, 1902	4,791,993	37,662,058

It will be observed from the table that only twice—the last quarter of 1903 and the first quarter of 1904—have net earnings been lower than for the past quarter. The third and fourth quarters of 1903 and the second and third quarters of 1907 were the only times when unfilled orders were as low as on March 31, 1908.

WAGE COMMITTEE

Of the Amalgamated Association—Convention Opens May 5.

President P. J. McArdle, of the Amalgamated Association of Iron, Steel & Tin Workers, has announced the appointments to the wage committee of the workmen which is to draft the annual scale of wages for presentation to the convention of the association. The wage committee will assemble for its labors at the Tod house, Youngstown, May 1, at 10 o'clock, and will submit a provisional scale to the main body of the convention, which opens in that city, May 5. Following the final approval of the draft by the workmen, the manufacturers will be met in conference and the year's schedules will be determined.

The wage committee is made of the following members:

Boiling Division.—Thomas Williams, vice president, Pittsburg; John James, McKees Rocks, Pa.; Joseph Grandidier, New Albany, Ind.; John A. Jones, E. Chicago, Ind.; Thomas J. Callahan, Terre Haute, Ind.; George Banks, Cleveland; Richard Fitzgerald, Wheatland, Pa.; John Hoffa, St. Louis.

Finishing Division.—Ben F. Jones, vice president, Pittsburg; Frank Williams, E. Chicago, Ind.; John DeCrastos, Vincennes, Ind.; Enoch Williams, Youngstown; Elias Jenkins, Youngstown; William Jenkins, Anniston, Ala.; John Donovan, Madison, Ill.; James P. English, E. St. Louis, Ill.

Sheet Division.—Llewelyn Lewis, vice president, Martins Ferry, O.; George Bender, Pittsburg. William Hillon, Martins Ferry, O.; Leo Smith, Martins Ferry, O.; T. J. Craig, Piqua, O.; H. J. Allington, Newport, Ky.; Elmer Lowry, Youngstown; Edward Hemstreet, St. Louis.

Tin Division.—Walter Larkin, vice president, Martins Ferry, O.; Richard Selway, Steubenville, O.; William Payne, Wheeling, W. Va.; George McAninch, Martins Ferry, O.; John Wilhelm, Ellwood, Ind.; Llewelyn Hopkins, Canton, O.; James Sadler, New Castle, Pa.; John H. Richards, Granite City, Ill.

NEW CONCERNS

Are Being Organized to Manufacture in Various Parts of Indiana.

Indianapolis, Ind., April 27.—Fassett A. Cotton, state superintendent of public instruction, has sent a letter to each township trustee in the state asking them to build fire-proof school buildings in the future. He states that a building can be made practically fire-proof for little more than 10 per cent more than the amount usually expended upon such buildings.

The Advance Machine & Supply Co. had its second fire within a few weeks, last Wednesday night. It is believed that a gasoline tank exploded, and the loss was about $5,000. W. W. Williams, president, says the plant will be rebuilt at once and some new machinery will likely be needed.

Several wholesale men of this city are interested in the American Paving & Manufacturing Co., organized here last week with $50,000 capital. The company will manufacture paving machinery and appliances as soon as a plant can be obtained and equipped.

Muncie will build a $100,000 fireproof city hall.

It is understood that the Wabash Dredging Co., Terre Haute, just organized, will need some machinery and appliances before beginning operations. M. A. Steele, H. H. Hedges and M. W. Nehf are the directors.

The Indestructible Steel Wheel Co., which recently located at Lebanon, has increased its capital stock from $50,000 to $100,000 and will make some improvements. Harry J. Fish is the president.

A number of local factories are preparing to take advantage of the bonuses being offered by citizens of Anderson for locating in that city. At least three large plants now located here will move to Anderson. The Jenney Electric Mfg. Co. is among the concerns that will probably move and will likely erect a plant in Anderson that will employ from 600 to 700 men. Electric motors and generators and a general line of electrical appliances are manufactured. The Union Embossing Machine Co. and the Speed Changing Pulley Co., both under the same management, have already completed arrangements for starting a new factory in Anderson about May 10. The company manufactures gasoline motors for automobiles, automobile carburetors, speed changing transmission and wood embossing machinery. It is also reported that the Frazer Stove Co. will move although nothing definite has been done. Anderson people have raised $360 000 to be used in inducing companies to locate in that city.

CHANGES IN OTIS, BONNELL & COMPANY.

Charles A. Maher, who for many years has been in the business of manufacturing and marketing car wheels, and who is now, and has been since its formation, vice president of the National Car Wheel Co., has associated himself with Otis, Bonnell & Co., as sales manager of the car wheel department, and will handle exclusively the cast iron and steel tired street and steam railway wheels manufactured by the National Car Wheel Co., as heretofore, with offices at 408-409-410 Cuyahoga building, Cleveland.

J. E. Rawson will continue as sales manager of the steel department, and William F. Bonnell will devote his time largely to the interests of the Securities Corporation, Ltd., 40 Wall street, New York, and the Guanajuato Development Co., operator of mines, mills and railroads in the city and state of Guanajuato, Mexico.

Large Engine Shipments.—The Mesta Machine Co., Pittsburg, recently made shipment of a 32-inch and 56-inch x 50-inch twin tandem compound reversing engine for the Bethlehem Steel Co. This engine is to be connected to a 28-inch structural steel mill and forms a part of recent plant enlargements of the latter company. Two high pressure long cross head blowing engines 44-inch and 84-inch x 60-inch and two low pressure engines of the same type 84-inch and 84-inch x 60-inch, are in process of erection in the Mesta shops at West Homestead, Pa. These engines were ordered by the Cleveland Furnace Co.

Tack Plant Sold.—The plant of the Independent Tack Co., Cuyahoga Falls, O., has been purchased by Kent and Ravenna, O., capitalists, and will be moved to Kent shortly. E. O. Gross, the inventor of the tack machines, was president of the Cuyahoga Falls company. He retains his interest and will go to Kent to operate the plant.

Stack Reverts to Owners.—The blast furnace of the Tidewater Steel Co., Lebanon, Pa., which has been operated by the Pennsylvania Steel Co. under lease on spiegeleisen, was blown out April 17. The lease has expired, and the furnace property reverts to the Tidewater Steel Co.'s receivers.

THE NEW EMPLOYERS' LIABILITY LAW.

Senator Dolliver explains the employers' liability bill just enacted by congress in this wise: "First, it modifies the old law of the negligence of co-employes. The old law was to the effect that an employe injured by the negligence of a fellow workman could not recover. This bill abolishes that doctrine, and gives the employe the right to recover for injuries arising from the negligence of his fellow workman.

"The second proposition modifies the law whereby, in other generations, workmen were held by the court to assume the risks arising from defective machinery.

"In the third place, the present enactment modifies radically the law of contributory negligence. It has been uniformly held that an employe suffering an injury to which his own negligence contributed cannot, by reason of that participation in the injury, have any recovery at law. This act liberalizes that doctrine. It is based upon the theory that where an injury occurs partly by reason of the negligence of the employer and partly by reason of the negligence of an employe, the jury ought to determine what part of the injury arises from the negligence of the plaintiff and take away from the sum total of his damages allowed that part which can properly be apportioned to his own negligence.

"In the fourth place, the bill undertakes to modify the common law applicable to certain agreements or contracts made between employers and their workmen, in which the latter agree, in consideration of some form of insurance or indemnity fund, to give up the right to sue in the courts."

Bonus for Employes.—The statement has been widely published that the United States Steel Corporation has cut off the distribution of bonuses to employes. It is not true that any formal action has been taken, but there is very poor prospect of any bonus being paid as long as trade is at the current volume. The plan has not been discontinued, but its operation is being withheld pending the passing of the eighty million mark. The plan was instituted in 1903 and provided for the distribution of percentages of net earnings among certain responsible employes, when the annual earnings exceeded $80,000,000, distributing half the bonus quarterly in cash and investing the remainder in preferred stock at the end of each year.

SPECIFICATIONS FOR BESSEMER AND OPEN HEARTH RAILS

Adopted by the American Railway Association—Much Stress Placed Upon Tests—Great Care to be Taken in Keeping Records Showing Effects of Usage

In addition to specifications for Bessemer and open-hearth steel rails, the committee on standard rail and wheel sections of the American Railway Association at the meeting of the association last week in New York recommended the adoption of two standard rail sections for five different weights each, increasing from 60 to 100 pounds per yard by 10-pound increements. The association adopted the committee report. This decision in favor of new and better balanced sections will, in the opinion of the association, enable the manufacturers to roll the rails at lower temperatures, insuring finer grain and better wearing quality, as well as reducing the internal stresses. The specifications provide for the rejection of all rails containing dangerous physical defects and means have also been provided for keeping accurate records of the rails rolled from different parts of the ingot and for uniform reports of rail failures.

In regard to the discard question, the committee has always been of the opinion that it would be preferable to test the finished product than to specify details of mill manufacture, but the difficulties which have stood in the way of applying this theory in connection with the manufacture of steel rails have been caused by the fact that rails are generally ordered in very large quantities and the product of a rail mill is turned out at a very rapid rate. A system of detailed tests, which would answer in the case of axles and other material, would not be practicable in the case of rails, because of the lack of time to complete the tests without curtailing the output of the plant. It was this difficulty which led to the adoption of specifications covering the details of mill practice, especially in connection with the discard.

In pursuing the investigation of the discard question, a suggestion was received from William Metcalf that it would be reasonably practicable to apply this theory to the manufacture of rails by arranging to test to destruction a number of rail butts representing a certain proportion of the total output, and to base rejection on the results of these tests.

A trial lot of rails was rolled from the ingot without any discard, except such as was necessary to enable the bloom to enter the rolls, and after these rails had been cut into small pieces, they were broken under the hammer and the fracture examined. The test proved that, if "pipes" or other physical defects were present, they could be detected by this means, and it has also showed that it is possible to conduct the process of manufacture so that "pipes" or other physical defects will be reduced to a minimum, and that these defects may not occur at all, even in rails rolled from the top portion of the ingot.

The Arbitrary Discard.

Some of the advocates of a fixed and arbitrary discard have contended that the mere provision of discard to insure the elimination of "piped" rails was not sufficient and urged the rejection of a fixed percentage from the top of the ingot, because of the segregation that occurs in the upper portion. The question of segregation was given careful consideration by the committee, and while it is a fact that, due to the rearrangement of the constituent parts of the metal during the process of cooling and solidifying in the ingot mold, an analysis of the metal in the finished rail will often show a wide departure from the analysis required by the specifications, it is also true that an analysis of the metal taken from the different parts of the finished rail will frequently show similar wide variation. This discrepancy is due to the fact that the test ingot referred to in the specifications and upon which the chemistry specification is based, is taken from the ladle before the metal is poured into the ingot mold and before segregation takes place.

It has been assumed that, because of this variation from the standard composition of the metal in the finished rail, the rejection of all segregated metal would be warranted. On this assumption it would be necessary to discard more than a third of the upper part of the ingot to be on the safe side, as the segregation frequently extends that far, but notwithstanding this, the committee has a great deal of evidence that rails of good physical condition can be made from the upper portion of the ingot. The provision in the new specifications for stamping the rails to show their position in the ingot will enable the committee to obtain more definite information on the wearing qualities of rails of wide variations in chemical composition, which, from past experience, may occur without apparently affecting the safety or wearing quality of the rail. The committee was also convinced that it would be impossible for the mills to furnish more than a small percentage of the total rail requirements of the railroads with a phosphorus specification less than 0.10 per cent. The committee does not consider it proper to require less than 0.10 per cent phosphorus in a specification intended for general use and railroads desiring to obtain low phosphorus rails have the further option of using open-hearth steel.

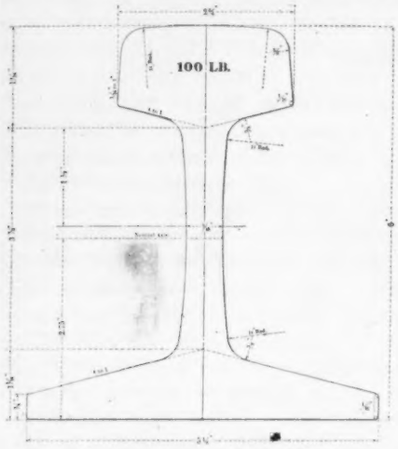
Two Types Favored.

In the matter of rail sections, the committee is confirmed in its opinion that a change from the American Society of Civil Engineers' section is necessary to obtain the best results in manufacture, and while it was agreed that it was desirable to unite on a single type as the standard of the association, the views of various members indicate that it will be necessary to provide two types, at least for the present, pending the time when both of these types can be tried out in actual service.

In designing the sections, the fear expressed by some of the members that the narrowing of the base proportionate to the height, made necessary to balance the section and secure work on the head at a lower temperature, would tend to reduce the stability of the rail and increase the cut of the ties, was given careful consideration, and it was determined that, so far as stability is concerned, the sections are well within the limits of safety. Although some of the members desired to retain the 85-pound standard, the committee determined to hold to its original recommendation in the matter of weights of section.

The specifications make no reference to the deflection under drop test, as definite figures can only be inserted

after the new sections have been actually rolled and tested. The adoption of a new standard type of anvil, which is very much heavier than used heretofore, was recommended by the committee. Two rail sections are provided, type A and type B, rolled in five weights each, as follows: 60 pounds, 70 pounds, 80 pounds, 90 pounds and 100 pounds.



TYPE A—100-POUND SECTION.

	Square inches.	Per cent.
Area of head	3.64	36.9
Area of web	2.29	23.4
Area of base	3.91	39.7
Total	9.84	100.0
Moment of inertia		48.94
Section modulus—head		15.04
Section modulus—base		17.78
Ratio periphery head to area head		1.80
Ratio periphery web to area web		3.21
Ratio periphery base to area base		3.29
Ratio total periphery to total area		2.92

The following specifications were adopted:

Bessemer Steel Rails.

The entire process of manufacture and testing shall be in accordance with the best current state of the art, and special care shall be taken to conform to the following instructions:

PROCESS OF MANUFACTURE.—(*a*) Ingots shall be kept in a vertical position until ready to be rolled, or until the metal in the interior has had time to solidify.

(*b*) "Bled" ingots shall not be used. ("Bled ingot"—one from the interior of which the liquid steel has been permitted to escape.)

(*c*) There shall be sheared from the end of the bloom formed from the top of the ingot, sufficient "discard" to insure sound rails. (All metal from the top of the ingot, whether cut from the bloom or the rail, is the "top discard.")

CHEMICAL COMPOSITION.—The chemical composition of the steel from which the rails are rolled shall be within the following limits:

Bessemer Steel Rails.

	60 pounds. Per cent.	70 pounds. Per cent.	80 pounds. Per cent.	90 pounds. Per cent.	100 pounds. Per cent.
Carbon	0.37 to 0.47	0.40 to 0.50	0.43 to 0.53	0.45 to 0.55	0.46 to 0.56
Manganese	0.80 to 1.10	0.80 to 1.10	0.80 to 1.10	0.85 to 1.15	0.90 to 1.20
Silicon	0.10 to 0.20	0.10 to 0.20	0.10 to 0.20	0.10 to 0.20	0.10 to 0.20
Phosphorus—not to exceed	0.10	0.10	0.10	0.10	0.10
Sulphur—not to exceed	0.075	0.075	0.075	0.075	0.075

(When lower phosphorus can be secured, a proper proportionate increase in carbon should be made.)

SHRINKAGE.—The number of passes and speed of train shall be so regulated that, on leaving the rolls at the final pass, the temperature of the rails will not exceed that which requires a shrinkage allowance at the hot saws, for a 33-foot rail of 100 pounds section, of 6½ inches, and ⅛ inch less for each 10 pounds decrease of section. No artificial means of cooling the steel shall be used between the "leading" and "finishing" passes, nor after the rails leave the finishing rolls; neither shall rails be held before sawing for the purpose of reducing their temperature.

DROP TEST.—The drop testing machine shall have a tup of 2,000 pounds weight, the striking face of which shall have a radius of 5 inches.

The anvil block shall be adequately supported and shall weigh 20,000 pounds.

The supports shall be a part of or firmly secured to the anvil.

The test piece shall be placed head upward on solid supports, 5 inches top radius, 3 feet between centers, and subjected to impact tests, the tup falling free from the following heights:

60,. 70 and 80 pound rail..... 16 feet.
90 pound rail..... 17 feet.
100 pound rail..... 18 feet.

One drop test shall be made on a piece of rail rolled from the top of the ingot, not less than 4 feet and not more than 6 feet long, selected by the Inspector from each heat of steel.

(Special or additional tests may be made at the discretion of the Inspector.)

The temperature of the test pieces shall be between 32 and 100 degrees, Fahr.

(*a*) If the test piece breaks without showing "pipe," or physical defect, all rails from that heat shall be rejected absolutely.

(*b*) If, however, the test piece broken shows "pipe," or physical defect, the top rail from each ingot of that heat shall be rejected, and

(*c*) A second test shall then be made of a test piece selected by the Inspector from a rail other than that from the top of the ingot. If this second piece breaks, the remainder of the rails of the heat shall also be rejected. If this second piece does not break, the remainder of the rails of the heat will be accepted.

If the test piece does not break under the drop test, it shall then be tested to destruction, and

(*d*) If, when so tested to destruction, the test piece shows "pipe," or physical defect, the top rail from each ingot shall be rejected, the remainder of the rails of the heat will be accepted.

(*e*) If, when so tested to destruction, the test piece does not show "pipe," or physical defect, all the rails of the heat will be accepted.

SECTION.—The section of rail shall conform to the template furnished by the purchaser as accurately as possible consistent with the paragraph relative to specified weight.

An excess of 1/32 inch in height of rails, and a variation of 1/16 inch in width of flange will be permitted, but no variations will be allowed in dimensions affecting the fit of the splice bars.

WEIGHT.—The weight of the rail shall be maintained as nearly as possible, after complying with the preceding paragraph, to that specified in the contract.

A variation of one-half of one per cent from the calculated weight of section, on an entire order, will be allowed.

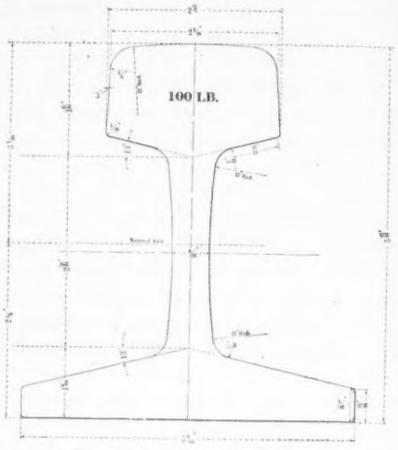
Rails will be accepted and paid for according to actual weight.

LENGTH.—The standard length of rails shall be 33 feet. Ten per cent of the entire order will be accepted in shorter lengths, varying as follows: 30 feet, 28 feet, 26 feet and 24 feet. A variation of ¼ inch from the specified length will be allowed.

All No. 1 rails less than 33 feet long shall be painted green on both ends.

DRILLING.—Circular holes for splice bars shall be drilled in accordance with specifications of the purchaser. They shall in every respect conform accurately to drawing and dimensions furnished and must be free from burrs.

STRAIGHTENING.—Care must be taken in hot-straightening rolls, and it must result in their being left in such condition that they shall not vary throughout their entire length more than three (3) inches from a straight line in any direction when delivered to the cold-straightening presses. Those which vary beyond that amount, or have short kinks, shall be classed as second quality rails and be so marked. Rails while on the "hot" beds shall be protected from coming in contact with water or snow. The distance between supports of rails in the gagging press shall not be less than 42 inches; supports to have flat surfaces. Rails shall be straight in line and surface and smooth on head when finished—final straightening being done while cold. They shall be sawed square at ends, variations to be not more than 1/32 inch, and prior to shipment shall have the burr caused by the saw cutting removed and the ends made clean.



TYPE B, 100-POUND SECTION.

	Square inches.	Per cent.
Area of head	3.95	40.2
Area of web	1.89	19.2
Area of base	4.01	40.6
Total	9.85	100.0
Moment of inertia		41.3
Section modulus—head		13.70
Section modulus—base		15.74
Ratio periphery head to area head		1.64
Ratio periphery web to area web		3.60
Ratio periphery base to area base		2.49
Ratio total periphery to total area		2.37

BRANDING.—The name of the maker, the weight of the rail, and the month and year of manufacture shall be rolled in raised letters and figures on the side of the web. The number of the heat and a letter indicating the portion of the ingot from which the rail was made shall be plainly stamped on the web of each rail, where it will not be covered by the splice bars. Rails to be lettered consecutively "A," "B," "C," etc., the rail from the top of the ingot being "A." In case of a top discard of 20 or more per cent, letter "A" will be omitted. All rails marked "A" shall be kept separate and be shipped in separate cars.

No. 1 RAILS.—No. 1 rails shall be free from injurious defects and flaws of all kinds.

No. 2 RAILS.—Rails which, by reason of surface imperfections, are not classed as No. 1 rails, shall be considered No. 2 rails, but No. 2 rails shall not be accepted for shipment which have flaws in the head of more than ⅛ inch, or in the flange of more than ¼ inch, in depth, and these shall not, in the judgment of the Inspector, be, in any individual rail, so numerous or of such a character as to render it unfit for recognized No. 2 rail uses.

Both ends of No. 2 rails shall be painted white, and shall have two prick punch marks on the side of the web near the end of the rail, so placed as not to be covered by the splice bars. They must be kept separate from No. 1 rails and be shipped in separate cars.

INSPECTION.—(*a*) Inspectors representing the purchaser shall have free entry to the works of the manufacturer at all times while the contract is being executed, and shall have all reasonable facilities afforded them by the manufacturer to satisfy them that the rails have been made in accordance with the terms of the specifications.

(*b*) The manufacturer shall, before the rails are shipped, furnish the inspector daily with carbon determinations for each heat, and a complete chemical analysis every 24 hours representing the average of the other elements contained in the steel for each day and night turn. These analyses shall be made on drillings taken from small test ingots. The drillings for analysis shall be taken from the ladle test ingot at a distance of ¼ inch beneath the surface.

(*c*) All tests and inspection shall be made at the place of manufacture prior to shipment, and so conducted as not to interfere unnecessarily with the operation of the mill. On re-

quest of the inspector the manufacturer shall furnish drillings for check analysis.

Open-Hearth Steel Rails.

The chemical composition of the steel from which the rails are rolled shall be within the following limits:

	60 pounds. Per cent.	70 pounds. Per cent.	80 pounds. Per cent.	90 pounds. Per cent.	100 pounds. Per cent.
Carbon	0.50 to 0.60	0.55 to 0.65	0.60 to 0.70	0.65 to 0.75	0.70 to 0.80
Manganese	0.75 to 1.00	0.75 to 1.00	0.75 to 1.00	0.75 to 1.00	0.75 to 1.00
Silicon	0.10 to 0.20	0.10 to 0.20	0.10 to 0.20	0.10 to 0.20	0.10 to 0.20
Phosphorus—not to exceed	0.04	0.04	0.04	0.04	0.04
Sulphur—not to exceed...	0.06	0.06	0.06	0.06	0.06

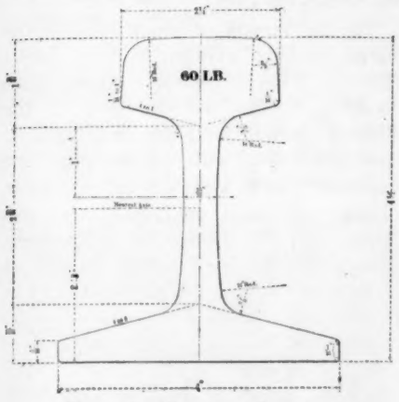
(When higher phosphorus is used, a proper proportionate reduction in carbon should be made.)

All open-hearth rails must be marked "O. H.," to distinguish them from Bessemer rails when in track.

The manufacturer shall, before the rails are shipped, furnish the inspector a complete chemical analysis for each heat.

Standard Gage of Tracks.

The committee further recommended the adoption of the rule covering standard gage of tracks adopted by the American Railway Engineering and Maintenance of Way Association,



TYPE A, 60-POUND SECTION.

	Square inches.	Per cent.
Area of head	2.21	37.7
Area of web	1.41	24.1
Area of base	2.24	38.2
Total	5.86	100.0
Moment of inertia		15.41
Section modulus—head		6.50
Section modulus—base		7.24
Ratio periphery head to area head		2.35
Ratio periphery web to area web		3.12
Ratio periphery base to area base		3.48
Ratio total periphery to total area		3.12

which follows: "That 4 feet 8½ inches shall hereafter be the standard gage of all tracks owned by the railroad companies forming this association. This gage shall be the distance between the heads of the rails measured at right angles thereto at a point ⅝ of an inch below the top of the rail."

The association has also adopted a resolution which amends the rule covering the standard distance between the main rail and guard rail. The amended resolution follows: "That the standard distance between the main rail and guard rail and in the throat of all frogs be ¾ inches measured at the gage line for all tracks of the standard gage."

The committee further requested that the members of the association keep careful record of the comparative results in service of rails of types A and B, for the purpose of later adopting a single type of section. The report also refers to favorable results secured with high-silicon rails in the London "tubes." While experiments with canted rails have not been carried on long enough to arrive at definite conclusions, nevertheless the experimental rails indicate that the canting will cause a tendency to tighten up the gage, and it has also been observed that on curves the metal of the top of the head "flows" to the inside of the rail instead of to the outside, as in the usual practice. The members of the committee on standard rail and wheel sections of the American Railway Association are as follows: G. L. Peck (chairman), general manager, Pennsylvania lines west of Pittsburg; J. T. Richards, chief engineer of maintenance of way, Pennsylvania railroad; F. A. Delano, president, Wabash railroad; R. Montfort, consulting engineer, Louisville & Nashville railroad; Wm. Garstang, superintendent motive power, Cleveland, Cincinnati, Chicago & St. Louis railway; R. L. Ettenger, consulting mechanical engineer, Southern railway; W. E. Fowler, master car builder, Canadian Pacific railway; P. H. Dudley, inspecting engineer, New York Central lines; J. W. Kendrick, second vice president, Atchison, Topeka & Santa Fe railway.

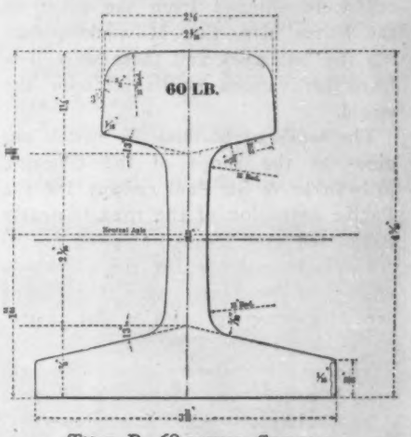
COST KEEPING

Considered by Machine Tool Builders —Cincinnati News Notes.

The Cincinnati members of the National Machine Tool Builders' Association held a meeting at the Business Men's Club on Tuesday, April 21, to hear Benjamin Franklin explain the proposed new system of shop cost keeping. Mr. Franklin is an expert accountant of Boston, and is in the employ of the association as an expert to formulate a plan or cost system for machine tool plants, which may be adopted uniformly by members of the association. Mr. Franklin is touring the large machine tool centers in the interest of this work, and his plan, when completed, is to be presented at the annual convention of the National Machine Tool Builders' Association at Atlantic City, May 19 and 20.

The Bullock Electric Co. employes, who have been drafted for service at the Allis-Chalmers plant in Milwaukee, left Cincinnati April 23, for that city. A large number of their friends gathered at the depot to bid them good bye. All of the expenses of the trip were defrayed by the Bullock company. A special freight train of 16 cars left in the afternoon of the 23d with the company's records and the household effects of the employes. The freight train was scheduled to arrive in Milwaukee at the same time as the passenger train carrying the employes.

Business in the machine tool shops, while still quiet, shows some improvement over the extreme dullness of December and January. The improvement is more noticeable in the lighter lines of tools. Manufacturers are endeavoring to take advantage of the slack business to improve their products and a number of new and attractive devices will soon be ready for the market. Strong efforts are being made to produce machines that will effect economies in shops, as it is realized that, under the present conditions, new and attractive devices must be presented to induce purchases. Some of the heads of the large companies are traveling in the interest of their business, and some encouraging reports of improvement in the outlook have been received.



TYPE B, 60-POUND SECTION.

	Square inches.	Per cent.
Area of head	2.28	38.8
Area of web	1.14	19.4
Area of base	2.45	41.8
Total	5.87	100.0
Moment of inertia		13.3
Section modulus—head		5.90
Section modulus—base		6.80
Ratio periphery head to area head		2.10
Ratio periphery web to area web		4.38
Ratio periphery base to area base		2.94
Ratio total periphery to total area		2.90

SOME IMPROVEMENT

Is Noted Among the Factories and Machine Shops of Milwaukee.

Milwaukee, Wis., April 25.—Conditions have improved somewhat in the Milwaukee iron and steel situation during the past week. While small orders have been the rule during the greater part of the present month, several good contracts have been received of late and inquiries and small orders have proportionately increased. Another carload of fire escapes has been received by the Milwaukee school department and the work of installing them will be started at once. The escapes are of the spiral variety and are from Dow Wire & Iron Co., Louisville, Ky.

Fifteen carloads of finished machinery were shipped from the plant of the Vilter Mfg. Co., Milwaukee, during the last week and these were destined for various points all over the world.

The work of building 30 switch engines at the shops of the Chicago, Milwaukee & St. Paul railway for the Pacific extension of the road is nearly completed and the building of standard freight engines for the extension will soon be taken up. The shops are now running with a full force, numbering nearly 3,000 men.

The Allis-Chalmers Co. has received orders for three 500-kilowatt Allis-Chalmers synchronous motor generator sets from the Youngstown Sheet & Tube Co., Youngstown, O.

The sheet metal works of the Nortman & Duffke Co. are running at full capacity with both night and day shifts and a number of new employes have been taken on during the last few days. While foundry work with the company is reported as dull, there seems to be decided improvement in the business of the company.

The work of testing the steel to be used in the erection of the new $500,000 auditorium for Milwaukee, has been given by the building committee of the Auditorium Association to the Pittsburg Testing Laboratory.

A strike of 5,000 members of the unions connected with the Structural Building Trades Alliance is expected at Superior, Wis., on May 1, as a result of the Builders' Exchange declaring for the open shop. This would greatly interfere with the work on the docks and plant for the Steel Corporation.

The following appointments were recently made in the engineering department at the University of Wisconsin by the regents of the institution: Prof. Carl C. Thomas, present head of the department of marine engineering at Cornell University, to the professorship of steam engineering, made vacant by the death of Prof. Storm Bull; A. N. Winchell, promoted to professor of mineralogy and petrology; H. J. Thorkelson, to professor of steam engineering; R. A. MacKeown, promoted to professor of machine design; J. W. Watson, to professor of electrical engineering; C. P. Watts, to professor of chemical engineering; R. C. Disque, elected as instructor of electrical engineering, and E. E. Parker, as instructor in applied engineering.

CANADIAN CROCKER-WHEELER CO. FORMED.

One of the signs of returning confidence in the business situation is the organization of the Canadian Crocker-Wheeler Co., Ltd., for the manufacture and sale in Canada of Crocker-Wheeler apparatus. The Crocker-Wheeler Co., Ampere, N. J., manufactures all types of direct-current and alternating-current motors and generators, power transformers, motor generator sets, frequency changers, etc., some of the best known lines being direct-current motors for special purposes, such as machine tool and printing press drive, and steel mill work. For the latter, a line of motors has been specially developed, which has been found to meet fully the very severe conditions which exist in steel mills. Crocker-Wheeler alternating current generators up to 2,000 kilowatt capacity have been in successful operation in Canada for some years.

F. E. Lovell, president of the new company, is a member of the old-established lumbering firm of H. Lovell & Sons, of Coaticocke, Que. Russell A. Stinson and F. Jno. Bell, vice president and secretary-treasurer respectively, have been identified with the manufacturing, construction, and sales ends of the electrical trade in Canada for the past 15 years, and are particularly well known in Montreal where the head office of the company has recently been opened in the Street Railway chambers, Place d'Armes Hill.

Bond Issue Authorized.—At a meeting of the stockholders of the Alabama Consolidated Coal & Iron Co., in Jersey City, April 22, they authorized the issue of $5,000,000 bonds, of which $3,500,000 are to bear 6 per cent and $1,500,000 5 per cent. President J. H. Hoadley announces that the proceeds of the bonds will be used for important improvements in Alabama.

TURBINE ACTIVITIES IN THE FAR EAST.

No less than 10 machines, aggregating 25,000 horsepower, are included in a large shipment of Westinghouse turbo-electric power equipment from East Pittsburg to the far east. Most of these machines will go to Japan for the equipment of railway, lighting and manufacturing plants.

One of the first machines to be put in service will be a 1,500 kilowatt turbine unit for Manila, to be installed in a station with four other machines of like construction put into service several years ago. Past experience with these machines has resulted in the recent extension. It will be recalled that this railway system was engineered and constructed by the American engineering firm of J. G. White & Co.

Hardly second in importance is the large turbine station of the Osaka Electric Co., Osaka, Japan, now building. This will be one of the largest power stations in Japanese territory and will contain for the present, 15,000 kilowatt in five units. Three of these machines are now being shipped from East Pittsburg. The remainder will follow as fast as they can be built and tested. The Osaka installation is under direct charge of Messrs. Takata & Co., of New York and Tokio.

In the strictly manufacturing field, there are two installations in process of erection, for the Imperial Steel Works of the Japanese government and the ship yards of the Hakkaido Tanko Steam Ship Co. Two 500 kilowatt Westinghouse-Parsons turbo units will comprise an initial installation in each of these plants. This gratifying reception of American motive power machinery in the far east, especially Japan, may be regarded as an index of future operations where government inspection is exceedingly rigid and is exercised along lines much more detailed than in this country.

The power plant of the New York subways is one of the largest in the world. It comprises nine engine units built by the Allis-Chalmers Co., Milwaukee, each engine with a rated capacity of 8,000 horsepower and an overload capacity of 50 per cent. The average daily duty of the plant is 800,000 kilowatt hours, the coal consumption is 1,000 tons and the water consumption for steam and condensation 1,800,000 gallons daily. A copy of the efficiency test of the plant can be obtained.

THE WESTINGHOUSE HORIZONTAL GAS ENGINE

The Result of Ten Years' Actual Development of Various Sizes and Types at the Plant of the Maker---Some Notable Installations.

In the adoption of the four-stroke cycle, the Westinghouse Machine Co. has proceeded in the belief that a gas engine of maximum simplicity and efficiency would result. The four-stroke cycle engine is self-contained. It does its own pump work and provides a sufficient length of time for the induction of mixtures to reduce fluid velocities and resulting friction to a reasonable amount, and avoids entirely auxiliary pumping apparatus, the sole function of which is to overcome this friction of ports and the passages within the allotted time. Furthermore, the four-stroke cycle avoids the necessity of attempting stratification, and utilizes a mixture always the most effective after once adjusted. This system does not involve uncertainty of combustion at light loads, if the purely throttling governing be employed, as is the case.

The tandem cylinder arrangement is standard for all sizes of engines whether single or double crank. The former gives two power strokes per revolution, the latter four power strokes per revolution with cranks at 90 degrees. This tandem arrangement, with fly wheels of reasonable size, easily yields a turning moment sufficiently uniform for all tandem work.

A brief summary of some important points of the Westinghouse engine follows.

Access to exhaust valve from main floor.

Two points of shaft alignment.

Main bearing shell removable without disturbing shaft.

Cylinder a symmetrical, one-piece casting supported at ends only.

Split jacket band provides access for cleaning.

Removable water rings on lower jackets for cleaning.

Cylinder accessible through valve openings without removing head.

Piston a symmetrical casting without internal ribs.

Piston port free from cylinder walls.

Two-part rods removable front and rear.

Floating metallic packing on rods.

Inlet, mixing and governor valves combined in a single mechanism.

One eccentric for both inlet and exhaust valves.

Air and gas mixed only at point of inlet.

Inlet and exhaust maximum dis-

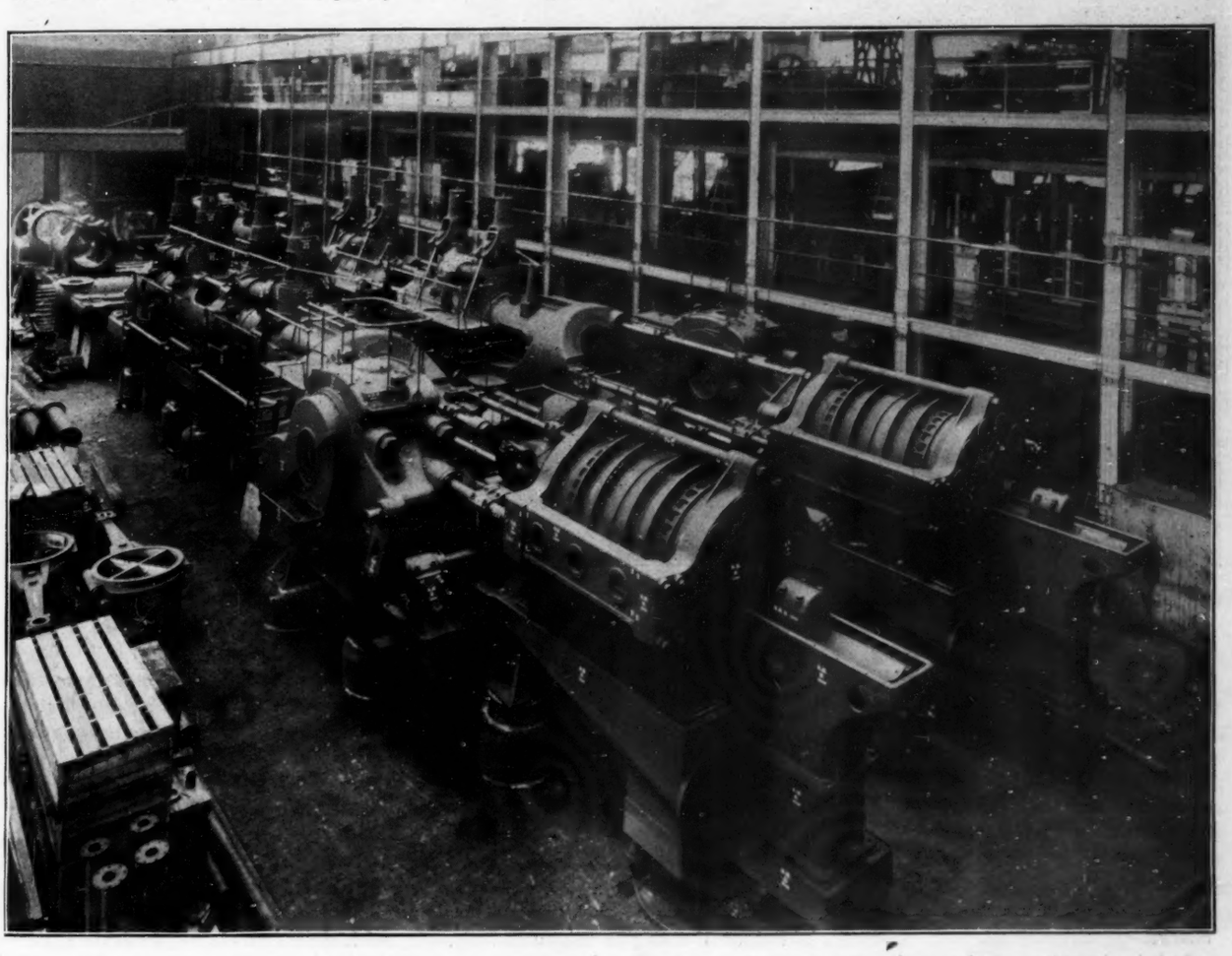


FIG. 1—GENERAL VIEW OF GARY BLOWING ENGINE IN ERECTING SHOP OF THE BUILDER. CAPACITY, 2,900 TO 3,000 BRAKE HORSEPOWER, 25,000 CUBIC FEET PER MINUTE AT 15 POUNDS. SLICK BLOWING TUB IN THE FOREGROUND.

tance apart, thus avoiding heating and contamination of mixture.

Individual governing at each inlet with relay system relieving governor of all work.

Governor driven direct from main shaft.

Automatic safety stop for both overspeed and loss of cooling water.

Two or more independent sets of igniters improving combustion and increasing power.

Igniter plug removable while engine is running.

Point of ignition variable while engine is running.

Double insulation of igniters; no platinum points; contact faces easily renewed.

Series water circulation for heads and pistons.

Independent water circuits for most important parts.

Open water funnels in each discharge.

Lubrication automatic and accurately timed.

Continuous gravity circulating system for engine oil.

Sight-feed oilers for important parts.

Starting automatic by means of compressed air.

Inoperative cylinders may be isolated while running.

Engine anchored forward; slides front and rear.

Accessibility.

Although a solid concrete block extends the full length of the housing and some feet in front, a clear space exists between the piers which permits access to the exhaust valves from the engine room floor. In large engines, the exhaust valves may also be reached from a sub-gallery or basement. To inspect a cylinder inside, it is only necessary to remove the inlet valve to permit a man entering through the opening. One piston may be removed through each end of the engine without disturbing the other head or the engine alignment.

Housing.

The main frame is of heavy box girder construction with internal ribs to withstand the transverse stresses arising from the side-crank construction standard in all Westinghouse engines. For this reason, the box girder completely surrounds the crank pit, forming a rigid rectangular structure anchored at the four corners. Access to the crosshead is obtained through windows in the housing. The center and rear housings are approximately cylindrical structures with the tops cut away to permit access to the center and tail rod slippers. Where cut away, center housings are reinforced by two removable steel struts designed to distribute the strains evenly to the cylinder bodies.

Cylinders.

The cylinders of the small engines are symmetrical, one-piece castings, having an opening in the jacket walls thus avoiding shrinkage in casting. Split jacket bands close the openings with joints made of a flexible packing which permits the cylinders to expand independently of the jackets.

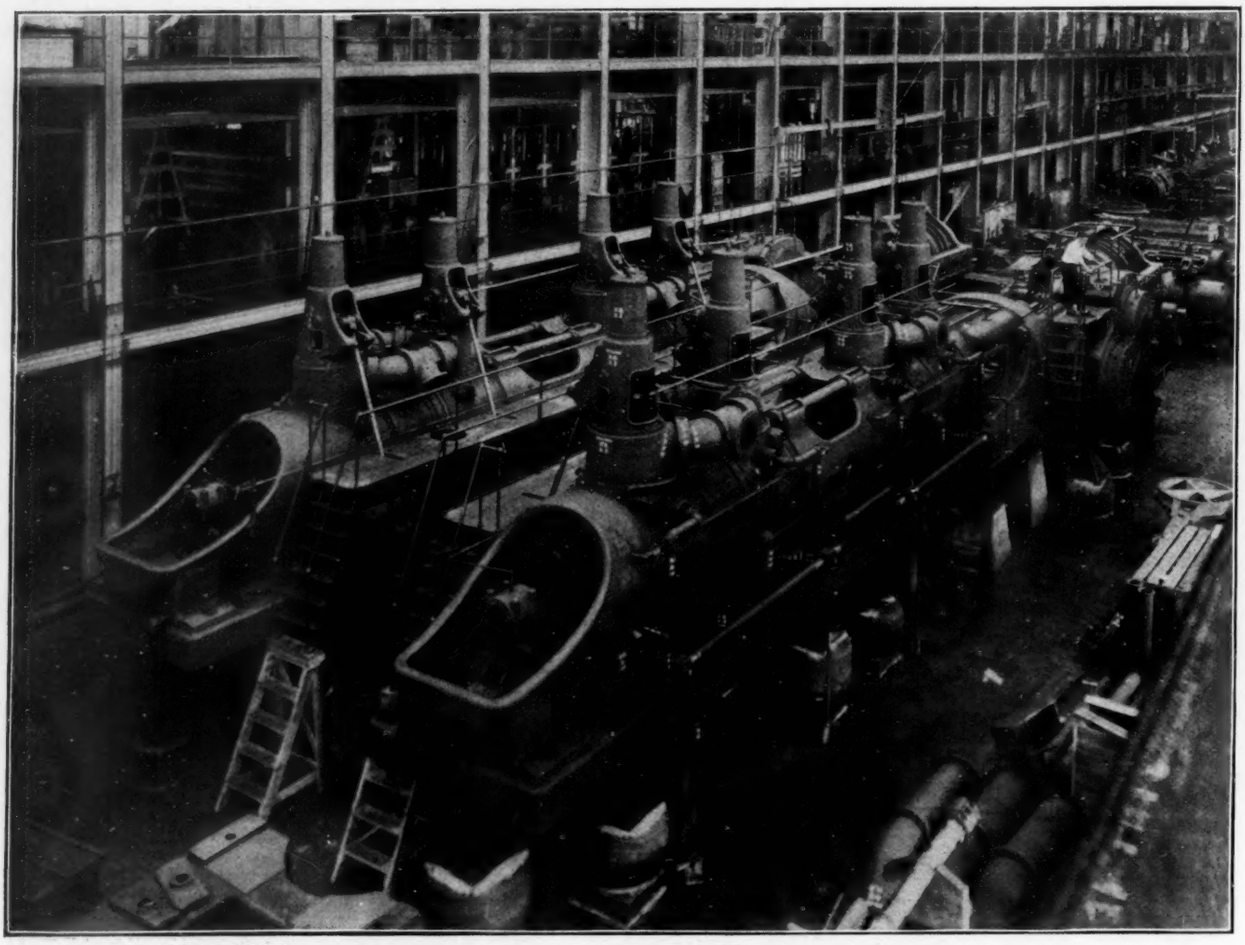


FIG. 2—GARY BLOWING ENGINE IN ERECTING SHOP. VIEW FROM GAS ENGINE END, SHOWING ARRANGEMENT OF CYLINDERS, VALVE GEAR AND REACH RODS FROM GOVERNOR TO MIXING VALVES.

Suitable openings in the jacket walls permit cleaning the water spaces, which are completely accessible by removing the jacket band and water rings at the bottom surrounding each exhaust. The cylinders of the large engines are cast in halves to insure sound castings with the best metal where most needed—at the center of the cylinders. The two halves are then fitted with a ground joint and arrow heads shrunk into the cylinder flanges.

The cylinder is supported at the ends only, and as the weight of the pistons and piston rods is carried by the crosshead, the cylinders are structurally simple cylindrical beams supporting their own dead weight at the ends. With the main frame securely anchored, cylinders are free to move longitudinally in machined ways supporting the housings.

Quick access to the cylinders may be had through the inlet valve opening. This is important, as it obviates the removal of a head. Another feature of the location of the valves in a vertical line at the center of the cylinder, is that heating and dilution of the incoming mixture is avoided. Exhaust gases discharge straight downward without encountering any pockets for the accumulation of foreign matter. Compression spaces of volumes suitable for the various qualities of gas can also be readily obtained without changing the design of pistons or cylinders, or the location of the valves.

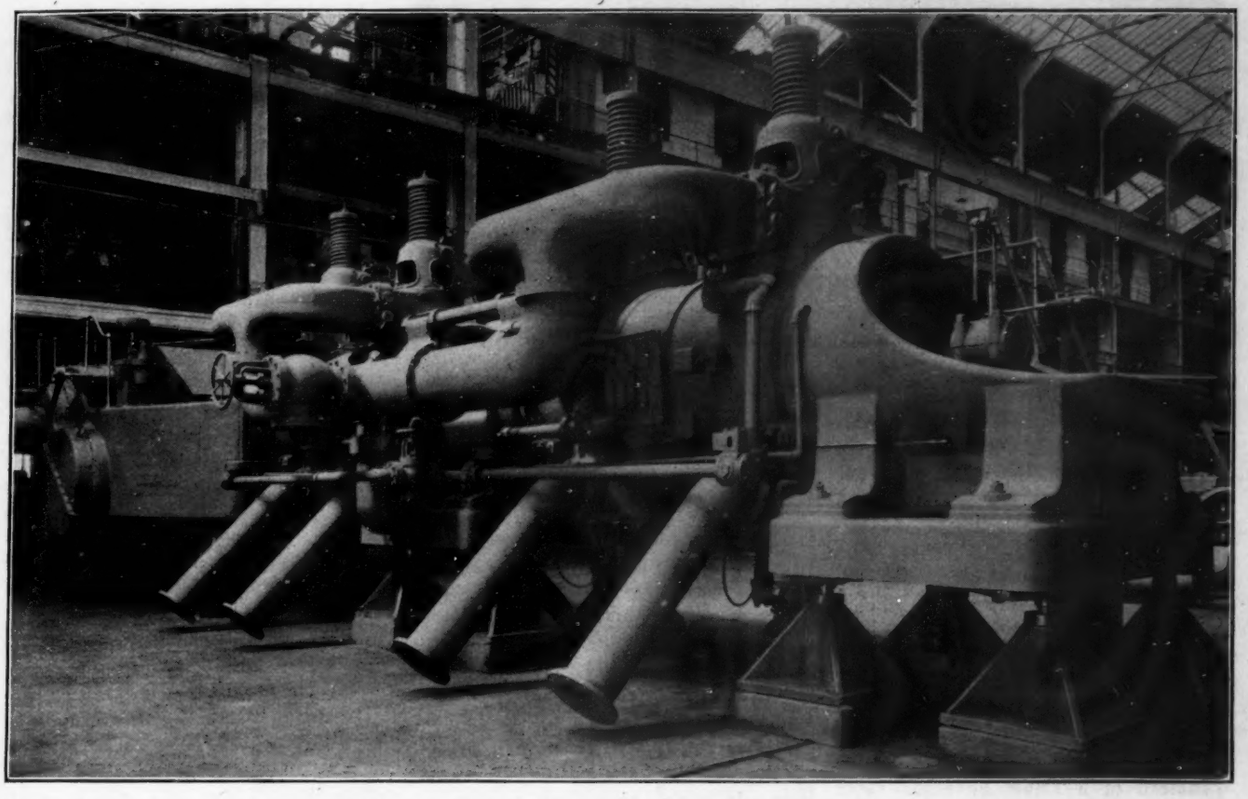


FIG. 3—SIDE VIEW OF 500-HORSEPOWER, SINGLE CRANK, TANDEM ENGINE, SHOWING GAS, AIR AND EXHAUST PIPING AND EXHAUST VALVES.

Shaft and Bearings.

As previously mentioned, all Westinghouse horizontal engines are of the side-crank construction, necessitating the alignment of but two bearings. The smaller shafts are solid forgings; the larger, are bored hollow. Cranks, counter-weights and crank pins are cast in one piece, with the pin at the bottom of the mold to insure homogeneous metal. This design of crank is made necessary because of the relatively short stroke and large shaft diameter required.

On engines under 1,000 horsepower, a three-part bearing is used, and on larger sizes, a four-part bearing, with the usual quarter box and screw and wedge adjustment. For the smaller sizes, the bearing cap hooks over the uprights for reinforcement. In the large sizes, through bolts are employed, as may be seen in Fig. 1. Here the cover is simply a distance piece or strut. Without disturbing alignment, the bearing shells may be rotated around the shaft and removed after relieved of the weight of the shaft. These bearings rest in spherical seats, and are consequently self-aligning.

Pistons.

The pistons are cast in one piece, symmetrical in design, and avoid internal ribs or sharp corners and without the use of chaplets or other methods of core support. They are permanently mounted on the rod with a straight press fit and a retaining nut turned off flush with the piston after being set up.

Rods are made in two parts so as to permit removal through front and rear housing, which avoids the extra building clearance for a through rod. They are bored hollow for cooling water, except at the center of the piston where the ducts connect. Front, center and rear crossheads support the entire weight of the pistons which float free from and concentric with the cylinder walls, thus relieving the latter of wear. The rods are not cambered but designed stiff enough to support the weight without undue deflection.

Packing.

Pistons are kept tight by sectional

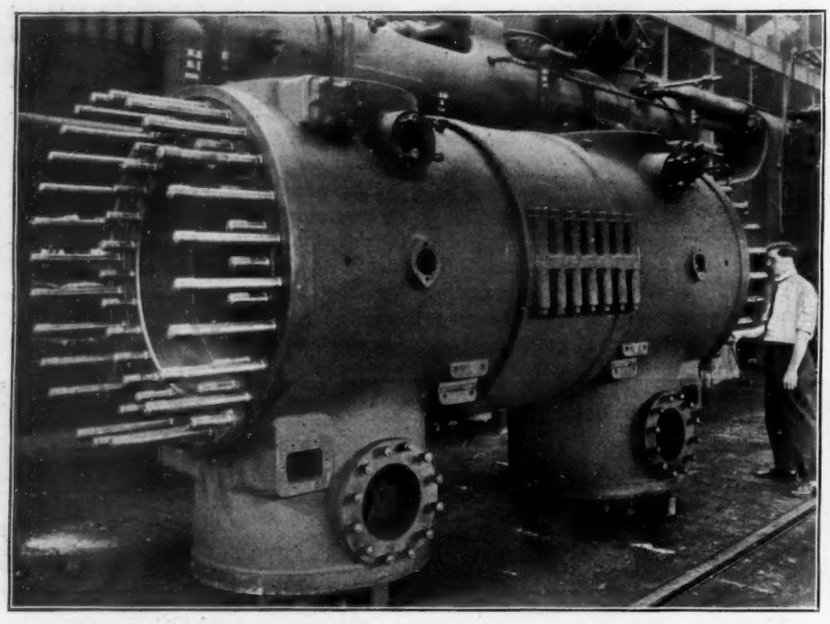


FIG. 4—ASSEMBLY OF CYLINDERS, SHOWING SPLIT JACKET BAND SURROUNDING JOINT IN CYLINDER EXHAUST VALVE CAGES AND OPENINGS, AND STUD BOLTS AND STUDS FOR ATTACHING CYLINDER HEAD AND FRAME.

rings with keepers and springs. For the rods, sectional metallic packing is employed consisting of a number of segments mounted in series along the rod with two solid fire rings next to the cylinder. These segments are supported by springs to relieve the rods of their weight so that they are practically floating. Adjacent segments break joints frequently with the result that when properly lubricated, the packing is exceptionally tight, yet occasions no wear upon the rods.

Valves.

Instead of a single governor valve controlling all inlets from a single point, the governing is accomplished directly at each inlet, the inlet valve performing the function of mixing and governing. Thus gas and air are mixed only at the point of entry to the cylinder, and in exact quantity required by the load.

The inlet valve has two distinct motions, one due to the eccentric and the other to the rotation of a loose internal sleeve controlled by the governor and provided with ports registering with corresponding ports in the surrounding valve cage. The essential function of this rotating sleeve is that of a purely throttling governor which opens or closes the respective ports according to the load. Hence the mixture itself remains unchanged at any load. Furthermore, the quantity of mixture which can be affected by a back fire is the comparatively small volume contained within the inlet valve sleeve.

Valve Gear.

An excellent feature of this engine is that only one eccentric is employed to operate both inlet and exhaust valves, instead of independent cams or eccentrics. This eccentric motion is transmitted by pull rods to a rocking cam motion similar to that used in marine work. Inlet and exhaust are, of course, reversed to accomplish the valve openings at proper points in the cycle. This motion gives the very desirable maximum power at opening, followed by rapidly increasing lift as the valve opens without bringing heavy thrusts upon the eccentric.

In the lay shaft drive, "hunting tooth" gears are used—the intermediate lay shaft running at an odd number of revolutions per minute. This distributes the wear evenly over all the gear teeth and greatly increases their life. The lay shaft carrying these eccentrics is driven from the main shaft by spur and bevel gear in place of the usual spiral gearing. This is designed to avoid the back lash which eventually develops with spiral gearing, due to the variable torque encountered. With fixed eccentrics and no lost motion, it is evident that no opportunity exists for change of adjustment of valves except from wear of the rolling cams, which is obviated by the use of generous contact areas well lubricated.

Exhaust Valves.

Hollow water-cooled valves of either cast iron or steel, are used in all sizes, or a combination valve with cast iron head and steel stem. Inside the bore, a small tube rises to the head of the valve constituting an overflow pipe. Cold water ascends through the outer annulus. The internal pipe not only prevents air pockets being formed, but also insures that the valves never become dry. Stems are lubricated about the middle of the bushing. To remove the valves it is only necessary to drop out the entire cage with the assistance of a rope swing.

Governing.

By means of an oil pressure relay system the regulator is entirely relieved of the actual work of moving the heavy valves. Fig. 2 shows the location of the regulator and relay, driven direct from the engine shaft and connected by means of reach rods to the various inlet valves. The regu-

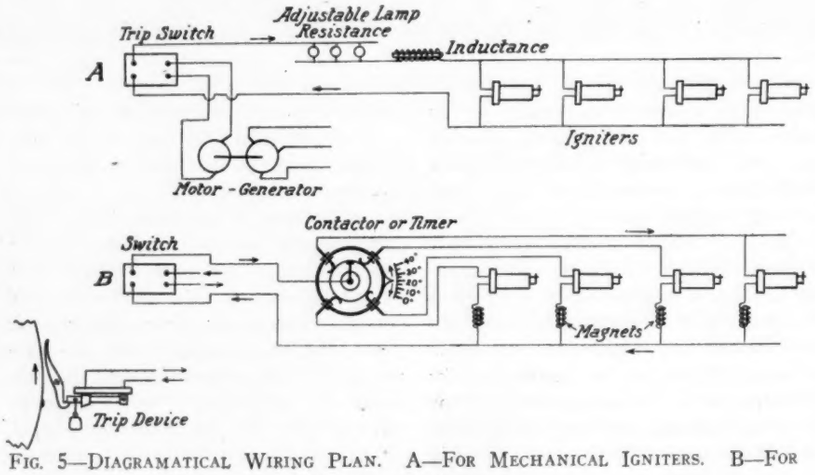


FIG. 5—DIAGRAMATICAL WIRING PLAN. A—FOR MECHANICAL IGNITERS. B—FOR MAGNETIC IGNITERS.

lator itself is of a purely centrifugal type, but European design—the Hartung or the Jahns. Each involves straight line motion for the governing weights and is fitted with an oil dash pot to prevent hunting. By driving the regulator directly from the main shaft, the effect of variable torque in a lay shaft drive, is avoided. Oil pressure for the relay is supplied at about 60 pounds pressure by a small pump (either of the rotary or the piston type) driven from the engine lay shaft.

Automatic Safety Stop.

In the event of a possible disablement of the governor, a safety device interposes and shuts down the engine by cutting off the ignition. This stop consists simply of a spring balanced plunger in the rim of the fly wheel which emerging, due to centrifugal force, at a predetermined speed, trips a pawl and opens a switch in the igniter circuit. This is shown in the diagram of the igniter wiring, Fig. 5. Combined with this device, in some plants is an additional safety stop to open the same igniter switch should the water supply to the jackets fail. This operation results from the movement of a loaded diaphragm under pressure of the cylinder water supply.

Ignition.

Make and break ignition has been adopted to the exclusion of all other systems after such experimenting, as the most practical for average conditions. Jump spark ignition proved satisfactory on rich gas, but showed erratic results with the high compressions used in blast furnace gas practice. Platinum points, formerly used, are now entirely done away with, and cast iron or a special bronze is employed for the moving contact, working against a fixed steel terminal. High voltages and low current furnished by a small motor-generator

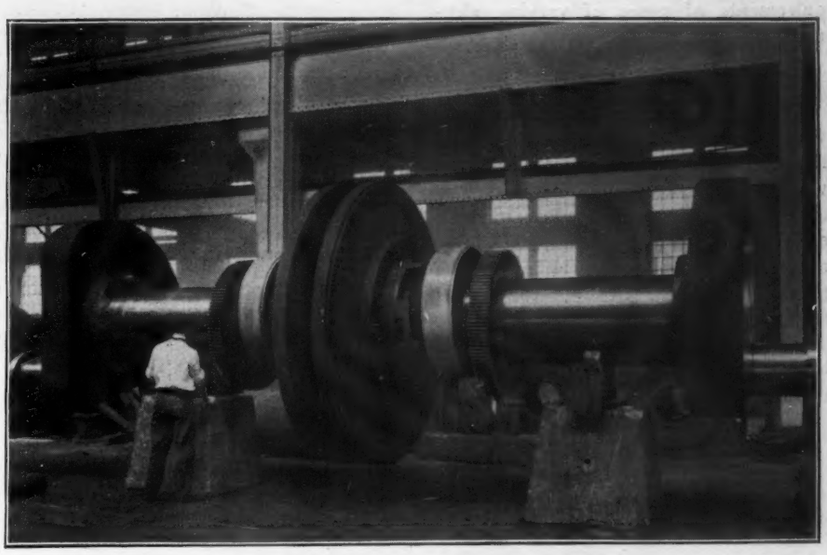


FIG. 6—ASSEMBLED CRANK SHAFT FOR GARY BLOWING ENGINE, SHOWING FLY WHEEL HUB, AIR TUBE ECCENTRICS AND LAY SHAFT GEARING. WEIGHT, COMPLETE, APPROXIMATELY 56 TONS.

gives the desired security of action and long life. Both sides of the igniter circuit are thoroughly insulated by mica washers, thereby making a double ground necessary to put an igniter out of commission. Vent holes are drilled through the igniter cap to permit the escape of any gases or vapors which would otherwise be condensed inside. In the event of a serious ground, an igniter immediately insulates itself by the blowing of a fuse, one of which is inserted in each independent circuit.

Provision has been made for removing igniters while the engine is in operation, thus meeting an insistent demand. This is accomplished by shutting off gas from the cylinder and blocking open the exhaust valve, for which a lug or eccentric is provided. This relieves the compression.

An important point is the provision of two or more igniters for each combustion chamber, in the larger sizes, three igniters located at corners of an equilateral triangle. The results of using more than one igniter are, more rapid and perfect combustion and an increase in mean effective pressure of nearly 4 per cent for the second igniter; this irrespective of the increased security of ignition. Two types of gears are in use for operating igniters, the electro-magnetic and the mechanical cut-off. The former is shown in detail in Fig. 5, and consists of an electric magnet connected in series with the igniter terminals, and tripping by means of an S-shaped armature engaging the igniter lug. The coils themselves, furnish the required inductance ordinarily provided by spark coils, and, being in series with the points, it is evident that the apparatus will indicate trouble at once whether in magnet or igniter. This constitutes a tell-tale which in the mechanical system, must be provided separately in the form of a small board panel carrying choke coils fitted with iron sounders which trip in succession as the igniter contacts are made. An essential advantage of this system is that any number of igniters may be operated with the facility and with complex mechanism, and the conductor provides ready means for advancing or retarding ignition while the engine is running by simply rotating the case to which the contact points are attached.

The mechanical device carries the usual knockoff cams geared to the lay shaft through an adjustable drive designed to advance or retard the ignition in the same manner as in the magnetic system for meeting the re-

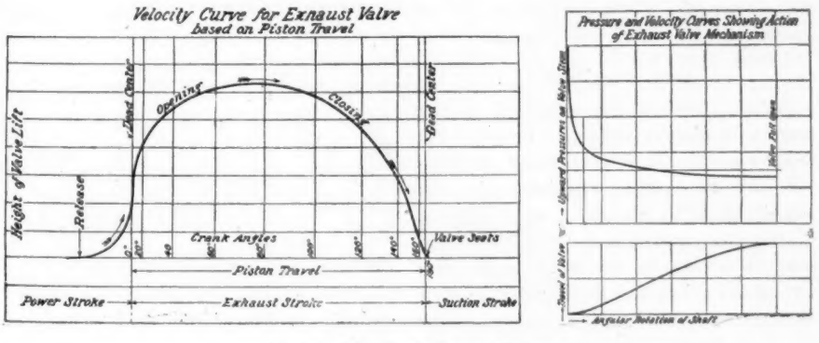


FIG. 7—VALVE OPENING CURVE.

quirements of gases of varying richness.

Lubrication.

Recognizing engine lubrication as a vital necessity, the builders have relieved the operator entirely of the work by automatic lubrication. For the cylinders, force-feed lubricators are employed. Most important, the oil is accurately timed so as to reach the piston just at the close of the power stroke when covering the oil ports. Thus during two working strokes at low temperature the oil is evenly distributed over the entire surface, insuring good lubrication with a minimum supply of oil. In a number of 500-horsepower plants, cylinder oil consumption is as low as from three to five gallons per week, 10-hour day. This timing may be accurately adjusted by means of the four small eccentrics. These lubricators serve cylinders, packing glands, and exhaust valve stems.

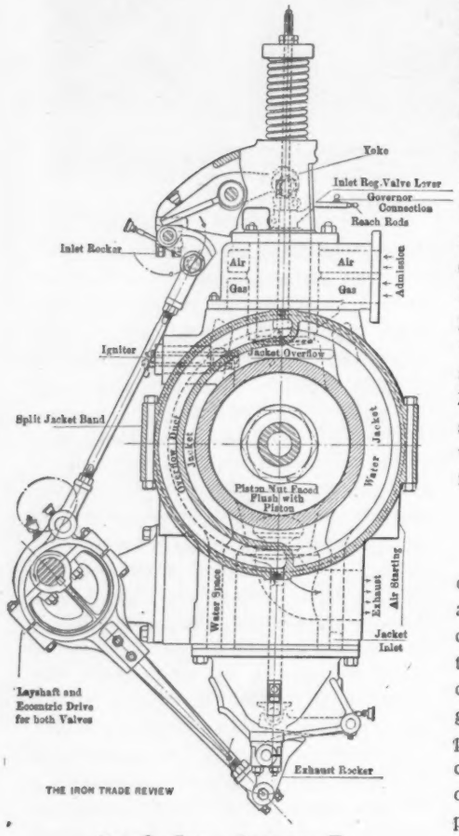


FIG. 8—SLICK BLOWING TUB.

Engine oil is served by a gravity system, including pump, filter and elevated reservoir with individual sight-feeds, all controlled by a single valve, so that individual adjustments, once set, need not be changed. Here again, the oil consumption has been reduced to a minimum.

Cooling.

Particular attention has been given to reducing the quantity of cooling water required for the engine. For this purpose a series system has been employed to some extent. Individual circuits, provided with open discharge, make it possible to follow closely the condition of each working part, thus, each cylinder, piston and exhaust valve have separate discharges. As pistons and heads have about the same exposed surface these parts are connected in series so as to secure a fairly uniform average temperature. Jacket spaces found in the cylinder are purposely of ample dimension to afford opportunity for occasional cleaning out of the sediment, or if necessary by the removal of the split jacket band; otherwise through hand holes and water ring at the base. Water enters the piston through telescopic connections located at the center cross head discharging front and rear into chambers cored out of front and rear housing. The velocity through rods and pistons is high enough to prevent the deposit of sediment, likewise the exhaust valves and other restricted areas. A water pressure of 25 pounds is all that is required for supplying all parts, and in some plants with exceptionally pure water, a 25-foot static head is sufficient.

Starting.

As in smaller sizes, the horizontal engines are started by compressed air and automatically through individual cams and poppet valves located along the lay shaft opposite each combustion chamber. With ignition on, the engine starts itself after opening compressed air and gas valves. As each cylinder picks up its ignition (after one or two revolutions) the compressed air supply automatically ceases by means of a check valve held to its seat by the combustion pressure. On the other hand, the air continues until combustion has started in all four chambers until shut off at the throttle. Then the air valves drop out of engagement by their own weight.

Gas Regulator.

As pressure of gas supplied to the engine is always subject to considerable variation, it is necessary to provide an automatic regulator in the supply line to maintain at the inlet valves the proper mixture. This mixture is ordinarily set by the operator by means of two butterfly dampers in the air and gas supply pipes leading to each inlet. The main gas regulator employed on Westinghouse engines consists simply of a butterfly disc valve inserted in the supply line, the position of which is controlled by a small gasometer connecting with the main on the engine side. Thus the movement of the gasometer and the butterfly follows instantly upon the varying demand for gas by the engine.

Slick Blowing Tub.

The gas engine end of the blowing unit, is exactly the same as that of the electric unit, with the exception that the generator is, of course, omitted, and the engine housings placed a little closer together. These blowing units are designed to furnish compressed air at 15 pounds per square inch normal pressure, and 25 pounds maximum, for short periods. As the pressure is not high, water-cooling of the blowing cylinders and cylinder heads is unnecessary. Air cooling is adequate for the low temperatures resulting from this small range of compression.

The pistons of the blowing tub are driven from the cross heads of the gas engine by means of two side rods connecting the gas engine and blowing tub cross head, the rods being on a diagonal one passing above, and the other below the engine shaft, the air and gas ends being placed vis a vis.

A unique feature of the Slick blowing tubs, is that the cylinder heads only are rigidly attached to the housing, the cylinder body being given a reciprocating motion by means of connecting rods attached to trunnions cast on the cylinder bodies. These connecting rods are attached to a rock shaft driven by eccentrics on the engine shaft. The ends of the cylinder bodies have ports in them extending around the entire circumference. These ports are covered or uncovered by the movement of the cylinder body with respect to the cylinder head, the joint between the cylinder head and cylinder body being made air tight by means of a snap ring inserted in a groove turned in the periphery of each cylinder head. These circumferential ports admit air to the cylinders during the suction stroke, the discharge from the cylinders being through valves placed in the cylinder head. The inlet valves are thus mechanically controlled, thus reducing the pressure drop necessary to get the air in the tub and avoiding entirely the pressure drop ordinarily encountered, required to lift the inlet valve against spring pressure. Consequently, a much smaller amount of negative work is done in compressing the air,

and the clearance losses are also materially reduced.

The advantages of the Slick blowing tub are, that in addition to the reduced amount of work required to compress the air to a given pressure, the mechanically opened inlet valves insure a full cylinder of air, thus materially increasing the capacity of cylinders of a given size. Further, the deposition of the inlet valve around the circumference of the cylinders, permits the use of much smaller clearances and the entire surface of the cylinder head for the outlet valves, resulting not only in a considerable increase in efficiency, but also obviating the outlet valve troubles experienced where these are of insufficient area. The outlet valves are readily accessible through hand holes opposite each valve.

As in the gas engine design, the weight of the blowing pistons and rods is carried by the cross heads, the piston having a clearance of about an eighth of an inch around its entire periphery. Four slippers, sliding on machined ways, support the weight of each cylinder body, thus obviating wear on the cylinder heads were the weight of the entire cylinder body supported on these small surfaces.

Practical Development.

The present Westinghouse horizontal double-acting gas engine is the result of about 10 years' actual development of various sizes and types at the East Pittsburg plant of the Westinghouse Machine Co. The Westinghouse engine may not, therefore, be considered an untried product, and this development period has witnessed its application to every known kind of fuel gas and to every kind of service for which reciprocating steam engines have been adopted.

During these 10 years, 1,054 engines have been entered on the order books, this aggregating approximately, 140,000 brake horsepower or a little over 140 horsepower per unit. The plants equipped, number 648, over one-third of which or 225, are above 100 horsepower. Moreover, more than 90 per cent of this total is either in operation, erecting, or in process of shipment. At this date there were also stock orders booked sufficient to bring the total business recorded by this company up to over 162,000 brake horsepower.

Among the engines in service there are many direct-current plants. For the above, both horizontal and vertical types have been installed. Among the industries may be mentioned the blast furnace plants of the Carnegie Steel Co. at Bessemer, Pa., and of the Indiana Steel Co. at Gary, Ind., cement mills at Iola, Kas., oil refineries at Philadelphia, gas compressors for long-distance transmission in the natural gas field, factory pumping plants, irrigation and canal pumping, and quick-starting fire service, as at Philadelphia.

Gases.

While the largest number of engines are running on natural gas, the largest plants use some form of manufactured gas, such as blast furnace, producer or coke oven. Natural gas developments in Kansas and elsewhere has brought about activity in gas power works, taking the form of installations such as Union Traction Co. and Iola Portland Cement Co. By-product coke oven gas promises an excellent field for development, although little has been done as yet. Installations at Lebanon, Pa., and Brymbe (Eng.) form conspicuous examples of this practice.

Producer Plants.

Within the past year very material progress has been made in the application of producer gas to all classes of service, and it is probably true that the future of gas power rests with the corresponding development of the producer. A number of successful types are now in operation using both bituminous and non-bituminous fuels, including both the suction and the pressure types, the former for plants up to a few hundred horsepower in capacity, and the latter for the larger plants.

At the end of March, 1908, there were 122 power plants equipped with Westinghouse producer gas engines, comprising 271 engines and aggregating 68,000 brake horsepower, or an average of 553 horsepower per plant. The engines averaged approximately 250 horsepower each, and all equipments contained in the above total were either in operation at that date or in course of erection. The largest producer plant, about 3,000 brake horsepower, operates the works of the Winchester Repeating Arms Co., New Haven, Conn. This plant runs on bituminous gas with the intermittent type producers.

Operation.

The most convincing proof of the capacity of a properly-designed, horizontal gas engine to most conditions of modern power service, is its ability to make long, continuous runs. In the mills of the Iola Portland Cement Co., the engines are normally in continuous operation and the record of 11 months shows actual operation 93.2 per cent for the horizontals and 97 per cent for the verticals; in other words, the total outages for engine inspection and repairs was but 1.32 per cent of the total elapsed time in the case of the horizontals and 1.6 per cent for the verticals. The total outages due to both plant and mill were as low as from 5 to 10 hours in 30 days. There are also similar records from the operation of two 3,000-horsepower air compressor engines. For four months out of the year these

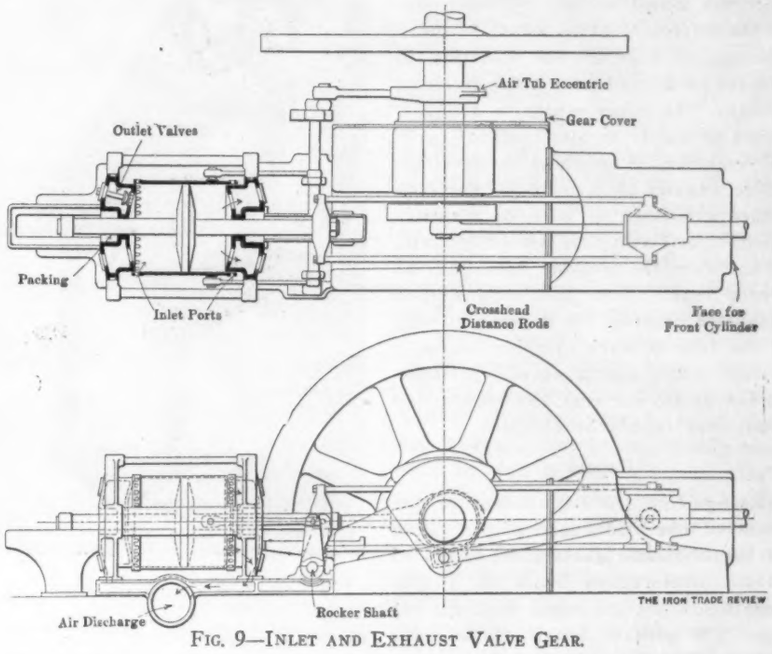


FIG. 9—INLET AND EXHAUST VALVE GEAR.

units operated about 93 per cent average of the possible running time, in some cases as high as 98 and 99 per cent. During all of this time, the plant was under load.

Parallel Operation.

Contrary to the general impression, parallel operation at all but excessive frequencies, has ceased to constitute a difficulty. Although spring couplings are used in the vertical type single acting engine, they are unnecessary in the horizontal engine, except for special cases. Moreover, standard fly wheels, used on Westinghouse gas engines, are but little heavier in pounds per kilowatt rated capacity, than steel wheels. Although a double or triple set of igniters is provided to insure to every possible degree, positive ignition, the actual cyclical variation due to the impressed crank effort, is but a fraction of that of the variation at present considered permissible in steam practice. In other words, a sufficient factor of safety in amplitude of cyclical variation, is provided in Westinghouse engines to provide for the contingency arising in case of displacement of one complete set of igniters; i. e., with the engine operating on "three legs." The governing system employed controls the mixture directly at the inlet to each cylinder; not at a distant point, and a speed regulation as low as 2½ per cent (no load to full load) may readily be obtained.

Capacity.

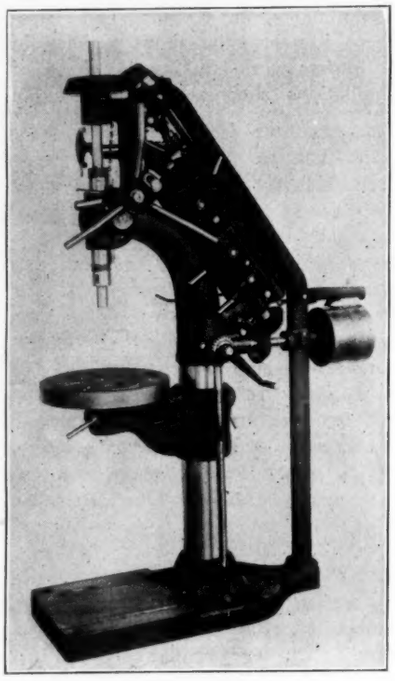
Recognizing the definiteness of the point of overload capacity, the rating of Westinghouse gas engines is placed at the conservative figure of 10 per cent below the maximum load the engine will sustain for a considerable period. Thus, an engine rated at 500 horsepower could sustain 550 horsepower for long periods.

Economy.

Owing to the high efficiency of the four-stroke cycle gas engine, economy is largely independent of the size of the unit, so that a 200- or 300-horsepower engine is nearly as efficient in heat consumption as an engine of 1,000 or more horsepower. Both show a heat consumption of close to 10,000 B. T. U. per brake-horsepower-hour. And this efficiency is largely independent of the kind of gas used, due to the fact that leaner gases will stand higher compression up to 200 pounds for furnace gas. An important result of this uniform efficiency is that very large units are unnecessary except in very extensive undertakings where smaller units would become too numerous. With the cost per horsepower also upon practically the same plane, this condition will be even more apparent.

NEW BARNES DRILL.

The accompanying illustration shows the first of the line of upright drills to be built by the Barnes Drill Co. of Rockford, Ill. The 20-inch drill illustrated, is complete with back gears and positive power feed. No cone nor feed belts are required and the speed changes can be made while



BARNES UPRIGHT DRILL.

the drill is in motion. The design of the frame and parts has been worked out to afford more than the usual strength of the same type and size drills. This tool is intended to handle twist drills up to 1 inch in steel without back gears or up to 1½ inches with the gears thrown in, for constant service. It will drive, it is claimed, a 1-inch high speed twist drill, running 190 revolutions continuously at a feed of 2 inches per minute in steel and 3 inches per minute in cast iron without back gears.

The design of the frame, including the back brace and the manner of carrying the back gears, offers novel features and provides a rigid construction. Both the change speed gears and the back gears, the former providing four changes, and the latter eight, are operated by means of small levers as indicated. The feed range is from 0.001 inch to 0.025 inches, with the power feed, and for both the power and hand feed control newly designed mechanisms are employed. For tapping, reversing friction pulleys are substituted for the tight and loose pulleys shown. With but slight changes a geared motor drive may be attached in place of the pulleys.

The general dimensions of the 20-inch drill are as follows: Height of drill, 70 inches; distance from column to center of table, 10¼ inches; maximum distance from spindle to table, 26¾ inches; maximum distance from spindle to base, 42 inches; diameter of column, 5¾ inches; diameter of table, 16 inches; diameter of spindle, 1 7/16 inches; vertical travel of spindle, 10 inches; vertical travel of table, 16 inches; spindle is double splined and fitted with No. 3 Morse taper hole; ratio of back gears, 4 to 1; size of tight and loose pulleys, 8 x 3; speed of tight and loose pulleys should be 400 revolutions per minute; floor space (exclusive of tight and loose pulleys which overhang 7 inches), 37½ x 16 inches; weight, 700 pounds.

MODERN FURNACE PLANT.

The Majestic Furnace & Foundry Co., Huntington, Ind., whose incorporation with a capital of $30,000 was recently noted, has located a modern plant at Huntington, which is now working full time. The structure is of brick, 130 x 140 feet, and includes a foundry, machine shop, sheet metal department, with warehouses and storage in addition. This company succeeds the Chappell Furnace Co., Morenci, Mich. J. M. Triggs, formerly manager of the foundry of the Chappell company, now holds the same position with the Majestic company. W. F. Triggs, who for several years has been associated with the Jones & Laughlin Steel Co., Pittsburg, is superintendent of the new Majestic plant. The coal chutes sales department is under the direction of H. F. Zent, and the furnace sales department is managed by L. O. Hall, formerly of Morenci, Mich. The company will continue the manufacture of the Majestic furnace and the coal chute, and beside handling a general line of gray iron castings it is operating a general machine shop and sheet metal department.

The United States produced 470,000,000 tons of coal in 1907, an amount equal to half the production of the whole world in 1906.

THE PRODUCTION OF MALLEABLE CASTINGS—III

By Dr. Richard Moldenke.

COMING now to the regulation test for malleable castings, we find it customary to provide for two classes, the heavy and the light. Thus the 1-inch square bar represents work ¼ an inch thick and over, and an inch by ½-inch section bar cares for the lighter castings. The bars are both 14 inches long. They should be cast at the beginning and at the end of each heat. About the fifth ladle from the start is generally selected for the first mold of test bars, and similarly the fifth ladle from the end, as nearly as may be gaged by the melter, serves for the last of the iron. Test bars and test wedges are cast from the same ladle, the molds being close to their respective furnaces. The idea is simply to have a record of all the metal cast from each furnace day by day.

Shape of the Test Bars.

The rectangular shape is used for test bars in preference to the round section, because the latter invariably shows serious shrinkage in the center, especially if the diameter is large, It is bad enough in the square bar, slightly so in the flat one, but in reality the sections thus used correspond to the castings it is customary to make of this material. A round section, unless in very light hardware, is avoided by the experienced malleable man, as he never knows but what the shrinkage in the center might have an outlet to the skin, and cause failure in service. The arguments in behalf of a round test bar for gray iron do not hold for malleable cast iron, as we deal here with an absolutely white iron, crystallized through and through. The complete change brought about in the structure through the heat treatment in the anneal, wipes out every trace of hardness, casting strains, even crystallization; and hence the four hard corners and soft intermediate spots existing in the square gray iron bar are absent in the finished malleable casting.

Interior Shrinkage of Test Bar.

Now about the interior shrinkage of the test bar. If an inch square bar is pulled apart in the testing machine, there will be a slight elongation in one part, the break being at its center. This part, the elastic limit of which was exceeded, is very short, and hence it has become customary to take the elongation within 2 inches. Thus, the bar which is to be tested has pricked on one of its sides a series of center punch marks, each 2 inches apart, and when the break occurs, the elongation is measured between the nearest points in question.

Suppose the break occurred very close to one of the jaws of the testing machine. It is then possible to place the same bar minus its short end in the machine again, and get another pull. Occasionally a third test can be had from the same bar. This has actually been the case time and again during the investigations of the writer, and the results have run say, 51,000 pounds per square inch for the first test, over 54,000 for the second, and 59,000 for the third. In the case of a more uniform material, like steel, where there is a stretching of the whole of the test piece before breaking at one point, the piece, if tested again, is considerably stronger than it was, a fact well known and nefariously used in the armor plate scandals now long forgotten. In the case of malleable, however, the test bar is not stretched except at the one point, the elastic limit being fairly close to the ultimate, and hence the bar, except at the very break, is in just the condition it was before the test. The first time it breaks at the place where the interior shrinkage is largest, the second time, at the next smaller shrinkage place, the third time, at the place still smaller, and so on, if this could be repeated indefinitely. All of which shows that but for this shrinkage problem some very great ultimate strengths could be obtained. As a matter of fact after the writer got to know something about malleable castings, and had introduced the improvements indicated by his researches, it was by no means uncommon to get results for months where the ultimate strength of the daily runs averaged 58,000 pounds per square inch, and in one case the breaking strength of a bar actually went as high as 63,000 pounds per square inch. Be it said in passing, that usually such strengths are to be deprecated, as they mean hard iron. while malleable is wanted soft and ductile. In the above case, however, some of the strong bars, tested transversely, on supports 12 inches apart (the customary method) gave deflections of 2½ inches, where ordinarily only half an inch is expected, which would indicate extreme softness.

Section of Test Bars.

Now to look a little further into this shrinkage question. If a bar were to be sliced in two longitudinally, and the interior magnified, a regular series of cracks at right angles to the length of the bar would be found. These cracks, very marked in the center, extend outwardly only a short distance, as may be seen in observing closely the black fracture of a broken bar. The center shows up like a large snow crystal, the edges flaring outwards in streaks, never very far, perhaps one-quarter the thickness of the casting. That these spots are actual breaks in the continuity of the bar is proven by the fact that occasionally these flaring edges of the shrinkage crack communicate with the skin of the casting through some small sand hole. The shrinkage, which looks so much like the snow crystal, will then be beautifully colored, showing the effect of oxidation by the entrance of air. While this is a common observation in castings which have sudden changes in section and no provisions taken to overcome the draw of the iron, it would not be so readily expected in well made, high grade test bars. But it is the case just the same, and every test bar, and for that matter every casting may be regarded as a shell of fairly continuous metal with an interior of slight planes of separation at right angles to the surface.

Taking into account the heavy contraction of white iron this is self-evident, for as soon as the metal sets against the mold, and the source of supply is cut off, the setting interior will pull away section by section, beginning at the colder end. An exaggerated picture of the longitudinal slice above mentioned would look like a rectangle with solid rims, the interior broken only by a running series of convex lenses from end to end, showing in section standing vertical. The longitudinal section of the test bar is shown in the accompanying illustration.

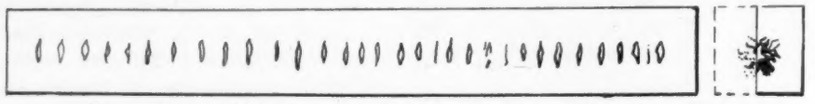
It is important to remember this characteristic of malleable cast iron, as it forms the basis of many a mysterious failure in otherwise good looking iron.

Importance of Physical Tests.

In contradistinction to gray iron, the

tensile test for malleable cast iron is very important. The ductility of the material allows it to be firmly and evenly gripped in the jaws of the testing machine, and hence the results are correct. The bars being cast either 1 inch square, or ½ x 1 inch, the calculations are easily performed. The elongation is taken in 2 inches.

The other test made is the transverse. The bars are laid flat on the knife-edge supports which are placed 12 inches apart, and pressure applied in the center. The removal of all the casting strains, etc., during the anneal make it immaterial which side of the bar (cope or drag) is laid up or down. While the transverse test is going on, the deflection is measured by an instrument placed under the bar, and a reading taken the moment of failure. From this transverse breaking weight or pressure, and the deflection it is possible to get a value for the resiliance of the metal, or its comparative resistance to shock.



LONGITUDINAL SECTION OF TEST BAR AND FACE OF FRACTURED BAR

Impact tests, much as they are to be welcomed, have not yet been perfected enough to cut any figure in the testing of malleable cast iron. It is only in the case of the malleable car coupler that elaborate drop tests were carried out, a standard machine as used for testing car wheels and modified for the purpose, being employed. This form of testing was ultimately abandoned as being unnecessary.

Improvement in Quality of Malleable Castings.

The history of improvement in the malleable casting is admirably reflected in the test records of any works that has them. Going back to the early 90's, the average tensile strength of malleable cast iron was about 35,000 pounds per square inch, with an elongation of about 2 per cent in 2 inches. The transverse strength perhaps, 2,800 pounds, with a deflection of half an inch. Toward the close of the 90's things were different, and a fair average of the malleable castings then made would run about 44,000 pounds per square inch with an elongation of 5 per cent in 2 inches. The transverse strength, about 3,500 pounds, with a deflection of ½-inch as before. These, while average figures for the general run of the work, were greatly exceeded in establishments where special attention was given to the niceties of the process. The tensile strength here would run 52,000 pounds per square inch regularly, with 7 per cent elongation in 2 inches. The transverse strength, 5,000 and over, with 1½ inches for deflection.

Deterioration in Quality of Malleable Castings.

With the passing of the hard times, during which nearly all the improvements in the malleable process were applied, came a swing of the pendulum which carried the tonnage of this material far upward. The result was an immediate deterioration in the quality of the castings. Furnaces were pushed to the limit. Steel melters took the place of many conservative and careful malleable men, and the metal suffered before it went to the anneal. The result was a drop in the quality of malleable castings, which has not been overcome to this day. Witness the specifications for these castings modified in 1904, when it was found necessary to drop the required ultimate strength from 42,000 to 40,000 pounds per square inch. There is much good malleable made in every works, but on the other hand, the scrap heaps bought from the large consumers, when examined for specimens with trade mark and approximate date on them, reveal a deplorable and unnecessary inferiority in what should be a high class product. Charge this to the incessant chase after tonnage and high pressure production.

Drawing Down Round Test Bars.

As an interesting side light on the tensile strength of malleable cast iron, there may be mentioned the results of experiments on drawing down round test bars of various diameters. These were heated red hot and handled exactly as crucible steel bars under the steam hammer to turn out the highest grades of tool steel. It was not possible to draw the malleable bars down very far, as the interior, on account of its high total carbon, cracked up very badly. The surface, however, remained intact, and acquired a high finish for a hammered bar. The results of the hammered portions of these bars were surprising, running from some 80,000 pounds per square inch in the larger sizes to 123,000 in the smallest. If the cracked and worthless interiors were to be deducted from the area of the hammered bars, the remaining good portions would show up as good as high class rods of tool steel. In effect the sound portions of the bars approach this in structure, as the result of heating and hammering.

The writer has made some 100,000 tests of test bars in the regular course of routine, and in addition has cut test coupons from the product of practically every important producer in this country, by the hundreds, subjecting them to tensile tests. This rise in quality and later deterioration can be readily traced from these records. Perhaps the intense competition prevailing is to be blamed for some of this. Most likely, however, it is a question of delivery in rush times, and too low remuneration when things are slack.

The specifications given below, formally adopted by the American Society for Testing Materials, are well adapted to secure reasonably good material. They were gotten up by a committee of well known malleable producers as well as engineers familiar with the subject. The specifications are introduced into the text because they will be recognized as eminently fair, and are the only official ones in existence. Every point in them has a reason connected with the manufacture of the castings, as will be seen from the subsequent discussions of the melting and annealing processes.

Specifications for Malleable Castings.

PROCESS OF MANUFACTURE.

Malleable iron castings may be made by the open-hearth, air furnace or cupola process. Cupola iron, however, is not recommended for heavy or important castings.

CHEMICAL PROPERTIES.

Castings for which physical requirements are specified shall not contain over 0.06 sulphur or over 0.225 phosphorus.

PHYSICAL PROPERTIES.

(1) Standard Test Bar.—This bar shall be 1 inch square and 14 inches long, cast without chills and left perfectly free in the mold. Three bars shall be cast in one mold, heavy risers insuring sound bars. Where the full heat goes into castings which are subject to specification, one mold

shall be poured two minutes after tapping into the first ladle, and another mold from the last iron of the heat. Molds shall be suitably stamped to insure identification of the bars, the bars being annealed with the castings. Where only a partial heat is required for the work in hand, one mold shall be cast from the first ladle used and another after the required iron has been tapped.

(2) Of the three test bars from the two molds required for each heat, one shall be tested for tensile strength and elongation, the other for transverse strength and deflection. The other remaining bar is reserved for either the tensile or transverse test, in case of the failure of the other two bars to come up to requirements. The halves of the bars broken transversely may also be used for the tensile test.

(3) Failure to reach the required limit for the tensile test with elongation, as also the transverse test with deflection, on the part of at least one test rejects the castings from that heat.

(4) Tensile Test.—The tensile strength of a standard test bar for castings under specification shall not be less than 40,000 pounds per square inch. The elongation measured in 2 inches shall not be less than 2½ per cent.

(5) Transverse Test.—The transverse strength of a standard test bar on supports 12 inches apart, pressure being applied at the center, shall not be less than 3,000 pounds, deflection being at least ½ of an inch.

TEST LUGS.

Castings of special design or specal importance may be provided with suitable test lugs at the option of the inspector. At least one of these lugs shall be left on the casting for his inspection at his request therefor.

ANNEALING.

(1) Malleable castings shall neither be "over" nor "under" annealed. They must have received their full heat in the oven at least 60 hours after reaching that temperature.

(2) The "saggers" shall not be dumped until the contents shall be at least "black hot."

FINISH.

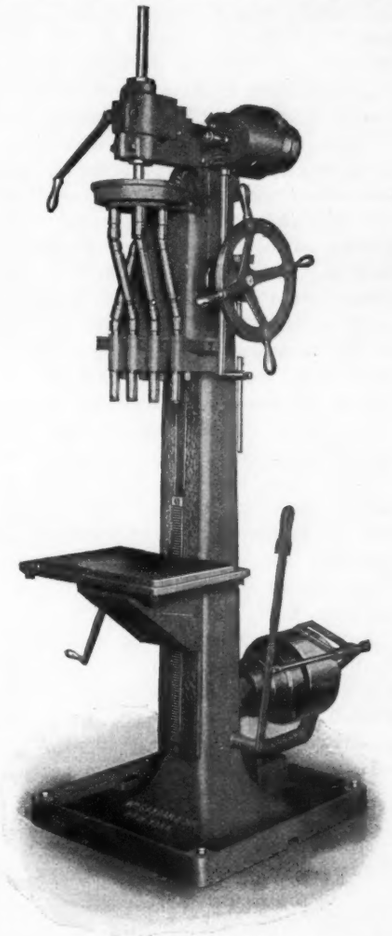
Castings shall be true to pattern, free from blemishes, scale or shrinkage cracks. A variation of 1/16 of an inch per foot shall be permissible. Founders shall not be held responsible for defects due to irregular cross sections and unevenly distributed metal.

INSPECTION.

The inspector representing the purchaser shall have all reasonable facilities given him by the founder to satisfy him that the finished material is furnished in accordance with these specifications. All tests and inspections shall be made prior to shipment.

Resilience of Malleable Cast Iron.

In addition to the records of the tensile and transverse tests, the



ADJUSTABLE MULTIPLE DRILLING MACHINE.

founder can also get a comparative idea of the value of his material for resisting shock. The resilience of malleable cast iron, as this is called, is measured by the product of the breaking weight times the deflection at that point, divided by twice the weight of the metal between the supports. This will give an arbitrary figure, let us say 680. By watching this from day to day, the iron ranging from 500 up to 1,650 for example, a very fair idea of the manner in which the castings run will be had.

CONCLUSION.

In concluding this general discussion of the testing of malleable cast iron, it may be said that for general purposes it is not altogether desirable to have a metal very high in tensile strength, but rather one which has a high transverse strength, and especially a good deflection. This will mean soft ductile metal which adjusts itself to conditions much more readily than a stiff strong product. It is not always that a strong and at the same time soft material can be produced in a foundry operating on the lighter grades of castings. The purchasen therefore, unless he requires very stiff material, should rather look upon the deflection of the metal coupled with the weight it took to do this bending before failure, than for a high tensile strength.

ADJUSTABLE MULTIPLE DRILLING MACHINE.

The adjustable multiple drilling machine shown in the accompanying illustration has been designed to take the place of the ordinary multiple drilling machines with fixed spindles. This machine is adapted for drilling at one time a number of small holes up to ½-inch diameter in automobile parts, typewriters, electrical devices, hardware, etc. This machine is built with a varying number of spindles, which have an adjustment forward and back of three inches, and sideways of 15 inches, the minimum distance between any two spindles being ordinarily 1¼ inches. Each spindle is capable of adjustment vertically to allow for the use of drills of different lengths and has a No. 1 Morse taper hole. Chucks can be fitted direct to spindles, if desired. The rail or head, which carries the spindles, is counterbalanced by a weight enclosed within the column. The table is 16 x 12 inches, and is supported on a very rigid enclosed box knee to insure rigidity in drilling and is adjustable by a rack and pinion and has ample working surface surrounded by an oil groove. The size and shape can be adapted to special requirements. The knee of the table and head bearings are scraped and are provided with gibs to take up wear. The base is made with a rim to prevent the overflow of oil, chips, etc. The countershaft is attached to the base, is fitted with tight and loose pulleys and has self-oiling bearings. The machine is suitable for working in gangs. Several of them can be mounted on a common base and arranged to work together or independently. When set in this way, one operator can take care of several machines. This machine is built by William Gardam & Son, 45 Rose street, New York City.

A NEW LINE OF AUTOMATIC GEAR CUTTING MACHINES

In designing its new line of gear cutters, the Cincinnati Shaper Co., Cincinnati, has aimed to produce machines of high efficiency and extreme accuracy, which will hold their alignment and eliminate cutter chatter, and to this end the bed of the gear cutter and the driving shafts have been made as short as possible; the shafts, at the same time, being of large diameter. Shortening the length of the bed has reduced the weight, but has increased the rigidity of the machine, and on account of the design of the cutter carriage, has not reduced its capacity nor the length of the bearing of the cutter slide of the bed. The guiding surfaces of the cutter slide and work saddle are rectangular, with long and narrow bearings, to lessen the binding action of the wide bearing, and both have full length taper gibs, adjustable endwise.

The cutter slide is fed forward and returned by positive clutch, the return clutch being cushioned to prevent any undue shock. The dogs for limiting the cutter travel are adjusted from the working side of the machine by means of a crank, a marked plate indicating the direction of the movement of the dogs. The construction of the dog moving device is shown in Fig. 4, which is a plan and elevation of the same removed from the machine. Two screws, C and D, are placed parallel to the bed of the machine. Spiral gears K and L are encased in a bracket M, and mesh with two spiral gears, R and S. Secured to these are two shafts, T and V. These shafts are made to fit a crank wrench on one end. Screws C and D are splined on the ends adjacent to the spirals K and L, and pass through and are feathered to them but are free to slide through them lengthwise. Adjustable dogs F and G strike a retractable tappet W secured to the cutter slide, and limit its travel by moving the clutch lever X. Dog F is threaded to engage screw D and has a clearance hole to allow screw C to pass through. Dog G is threaded to engage screw C and has a clearance hole to allow screw D to pass through. Screws C and D are turned smaller on the ends that pass through a back dog E, forming a shoulder for the same. A rod carrying the spool is shown at B, which is bored to receive the end of the screw and is secured to it, forming a collar for dog E. A hook for releasing the indexing mechanism is shown at J. Screws C and D pass through this hook and two collars H and I secured to C hold it in position. A tie block is shown at N, through which C and D pass and are secured in place by shoulders on one side, and collars O and P on the other. Spool A engages the clutch shifting lever X.

From the above it will be seen that if shaft V is rotated by a wrench in the hands of the operator, screw D will be rotated through spiral L, and dog F can be drawn to any desired position on the screws. Likewise if shaft T is rotated, screw C will rotate with it and Dog G will be moved to any desired position. When screws C and D are rotated, members E, J and N being collared to screws, do not change their relative positions to the screws lengthwise. E is made to rest on a slide secured to the bed of the machine to steady the screws. When the cutter slide tappet W strikes the dogs, the screws will be moved through the spiral gears in the direction of the cutter slide travel, until the lever is reversed, when the cutter slide will move in an opposite direction, until tappet W strikes the other dog, and will reverse in a like manner. The amount of travel is regulated by shafts T and V. The adjustable dog F is made lower than dogs E and G, so that the retractable tappet W will strike dog F in its lower or normal position, but will clear it in its retracted position, striking dogs E and G. The object of this arrangement is to permit the cutter slide to be run back to its extreme position on the bed without changing the setting of the dogs.

The dogs can be easily set before the machine is started by the following operation: The cutter slide is run to the extreme forward position desired and dog G is run against the tappet until the reversed lever throws the clutch over to engage the reverse side; the cutter slide is then moved back by hand until the desired back position is obtained and dog G is run against the tappet until the clutch is thrown over to engage the feed

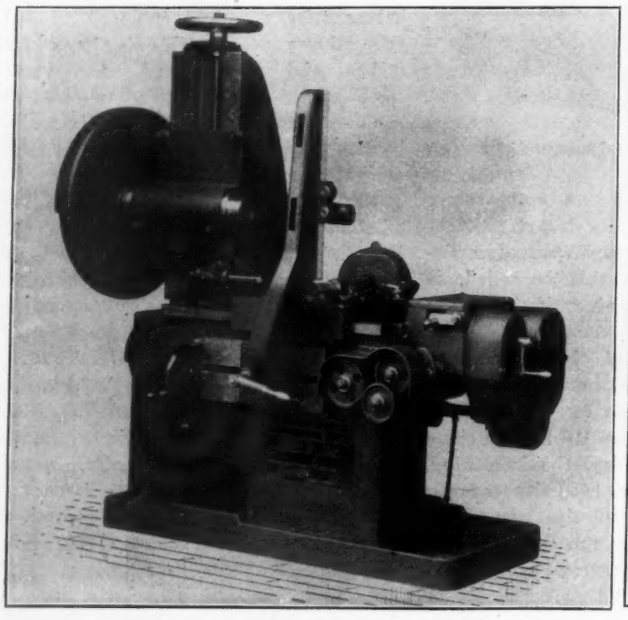


FIG. 1—FRONT VIEW OF AUTOMATIC GEAR CUTTER.

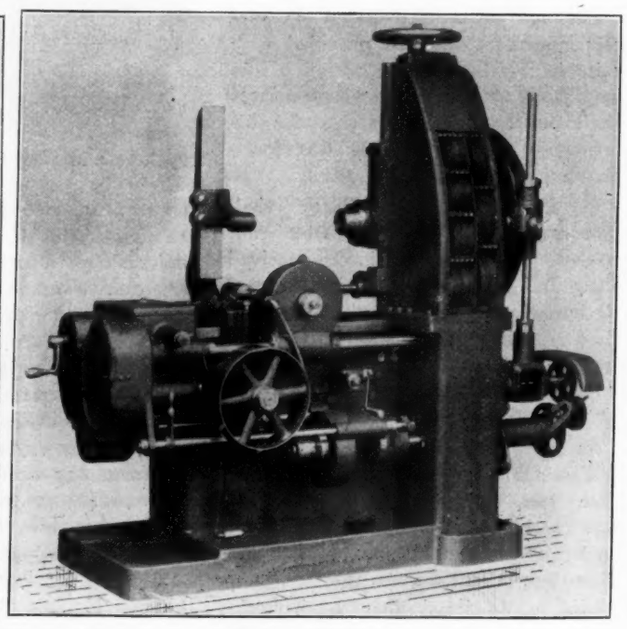


FIG. 2—REAR VIEW OF AUTOMATIC GEAR CUTTER.

side. It can readily be seen that the cutter slide will reverse at these positions.

In the accompanying illustrations, Fig. 1 is a front view of the automatic cutter and Fig. 2 is a rear view of the same. Fig. 3 is a plan view of the machine, and Fig. 4 is a plan view and elevation of the dog-moving device. Fig. 5 is a side elevation of the gear cutter and Fig. 6 shows the end elevations of the machine.

The indexing mechanism is simple in construction and contains no complicated parts. It operates without shock and is easily accessible. This mechanism is so interlocked with the feed screw that the cutter cannot enter the work unless the indexing has been completed. The index worm is disengaged from the wheel in a novel way dispensing with the cutter shafts and two spur gears.

The splined worm shaft *b* passes though the index worm *c*, as shown in Fig. 6. Two miter gears are enclosed in box *e* and swivel about shaft *f*, and by loosening a nut Z, Fig. 3, worm *c* can be swung out of mesh with the worm wheel Y. Stud *a* is set for the proper engagement of the worm with the wheel so

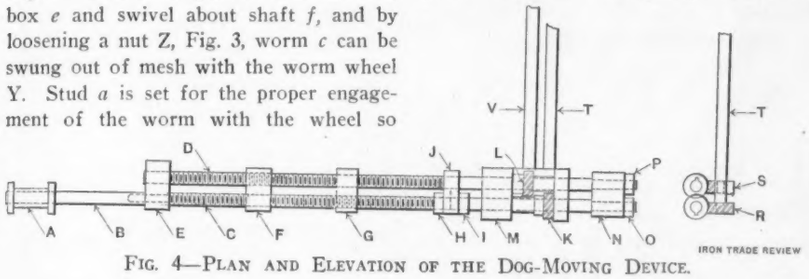


FIG. 4—PLAN AND ELEVATION OF THE DOG-MOVING DEVICE.

that the worm always goes back to the same position.

A friction is shown at *g* and, when loosened, shaft *b* and the worm can be rotated by disc *d* when setting the work. The arm for supporting the outer end of the work arbor is clamped to its bearing by a lever so that it can be quickly loosened and drawn back when placing work on the machine and taking it out.

The first machine built has been in constant service at the shop of the makers for the past six months, and has given satisfactory results. Gears of 3-pitch have been accurately cut in cast iron at the maximum feed of the machine, 7¼ inches per minute without previous stocking. Index change gears are furnished to cut all teeth from 12 to 100 and with the exception of prime numbers and their multiples, from 100 to 450. This machine can be motor driven if desired, the motor being secured to an extension to the base.

Plan to Pay Debts.—The creditors' committee of the Norwalk Steel & Iron Co., and the William Kavanaugh Co., Norwalk, O., has proposed a plan for the settlement of the obligations of the two companies on a basis of 75 per cent, payment to extend over a period of four years. The debts of the two companies aggregate about $800,000. Signers of the agreement whose debts are less than $300 may accept 30 per cent in cash in place of notes at 75 per cent, secured by mortgage. Creditors accepting the cash proposition must notify the Cleveland Trust Co., Cleveland, before June 1, 1908. The majority of the creditors, representing a majority of the entire agreement, and others are coming in rapidly, and it would appear that the greater part of the creditors will join in the agreement, and the plan may become operative soon.

No Government Foundry.—The proposal by Representative Cary, of Wisconsin, to build an iron, brass and steel foundry at the Washington navy yard, was defeated in the house of representatives several days ago. Two attempts were made by Mr. Cary to have his amendment calling for the establishment of the foundry inserted in the naval appropriations bill, but it was ruled out on a point of order. The amendment proposed to appropriate $300,000 for the construction of the foundry, of which $100,000 was to be available immediately. Mr. Cary declared that through the establishment of such a plant the government could save approximately $50,000 a year.

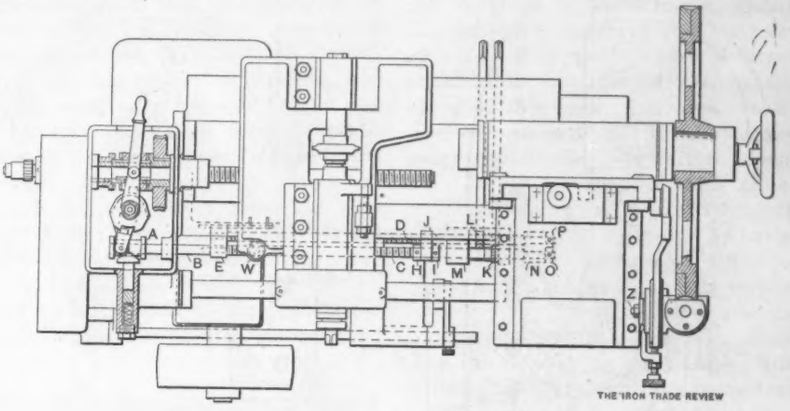


FIG. 3—PLAN VIEW OF AUTOMATIC GEAR CUTTER.

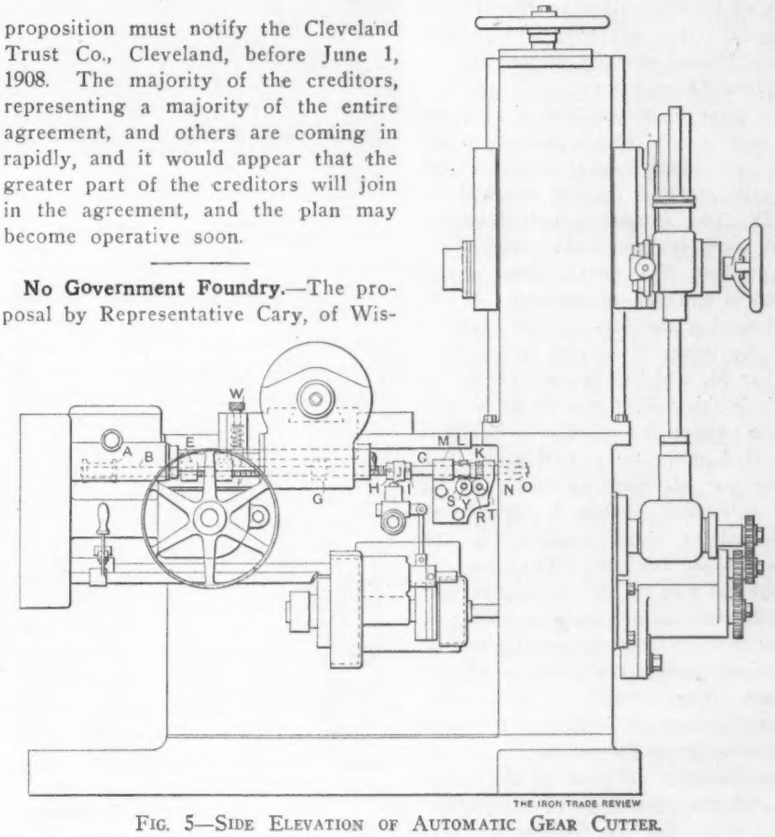


FIG. 5—SIDE ELEVATION OF AUTOMATIC GEAR CUTTER.

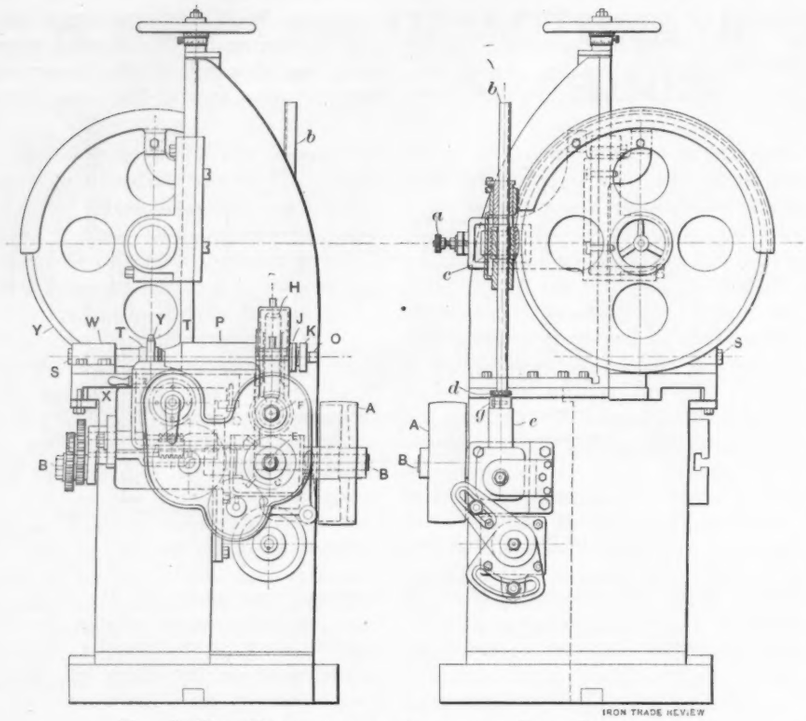


FIG. 6—END ELEVATIONS OF AUTOMATIC GEAR CUTTER.

FINISHING CYLINDERS IN THE TURRET LATHE.

The accompanying illustrations show a method of finishing cylinders in the turret lathe for which we are indebted to the Gisholt Machine Co., Madison, Wis. This article may be taken as supplementary to the articles on turret lathe practice, which have been published recently at intervals in THE IRON TRADE REVIEW.

The piece to be operated is centered and held by the chuck jaws B at its outer end, being further supported by the set screws E in the chuck bonnet D. This bonnet is bolted to the chuck and is provided with slots, which allow the chuck jaws to be moved in and out, as necessary. While rough-boring the hole in the cylinder with the cutter N carried in the boring bar M, which is supported in the chuck bushing R, the scale is broken on the end of the piece with the tool K carried in the turret tool post. The boring bar M_1 carrying cutter N_1, is used for finish boring, it also being supported in chuck bushing R, the same as is bar M. The hole is brought to size by the floating reamer Q, although some users consider it better practice to ream on the second operation, giving the piece a chance to cool. The sequence of these operations however, is largely determined by the design of the piece.

For finishing the end of the cylinder and the counterbore, the cutters F, G and H in the facing head are used, these heads being supported by the arbor T inserted in the bushing C in the finished hole.

The second operation of finishing is shown in Fig. 2. The piece is clamped to the chuck plate D by clamps B. The chuck plate is bolted to the face of the chuck. The piece is centered by a counterbore in the chuck plate, which is of the same size as the hole in the crank case. The bushing C is inserted in the piece for supporting the boring bars M and M_1, and the counterbore is finished with the cutters N and N_1, shown in the boring bars. The end of the piece is roughed off with the tool K in the turret tool post and is finished with the cutter G in the facing head. This head is supported by the arbor inserted in the bushing C. The cutter G is serrated giving a rough face to the end of the cylinder for the purpose of holding the packing. If it should be desired to ream the piece on the second operation, the reaming would be done after finishing the counterbore.

The method of chucking a different shape of gas engine cylinder, as employed by the Gisholt Machine Co., is shown in Fig. 3. The device used is a special bonnet bolted to the face of the chuck. It is shown in the il-

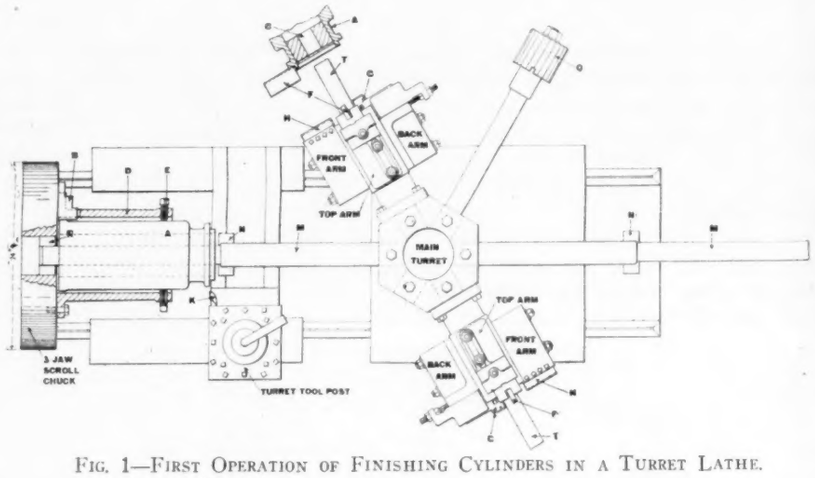


FIG. 1—FIRST OPERATION OF FINISHING CYLINDERS IN A TURRET LATHE.

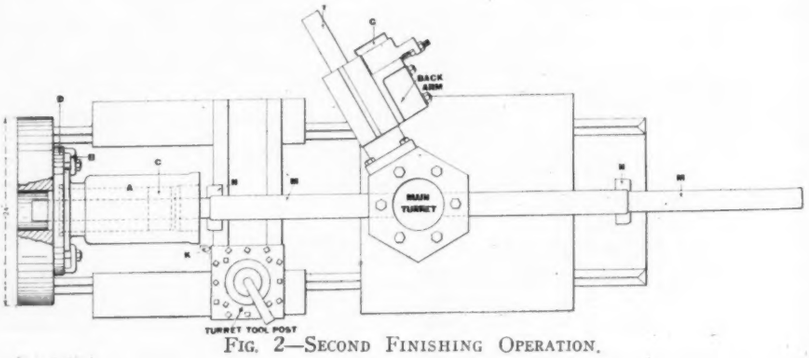


FIG. 2—SECOND FINISHING OPERATION.

lustration with the hinged strap thrown back preparatory to removing the finishing cylinder. This strap swings down over the piece and is bolted in place. Set screws, as shown, are used for the slight adjustment required to overcome the variation of the castings.

MANGANESE STEEL GEARS FOR TRAVELING CRANES.

A source of much difficulty in the operation of heavy overhead traveling cranes is the liability of serious delay through the breaking of the gray iron gears and pinions commonly employed. The experience of one manufacturer in this connection is interesting. The teeth in the main gear

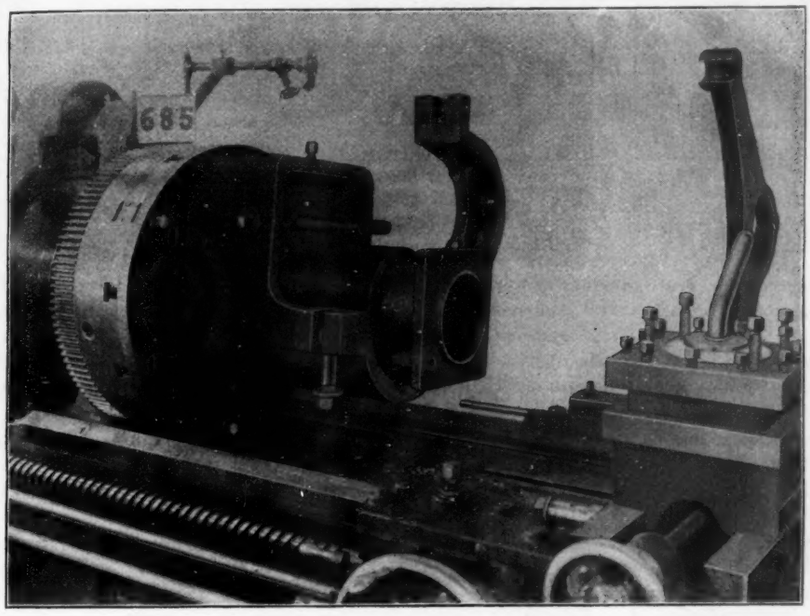


FIG. 3—METHOD OF CHUCKING A GAS ENGINE CYLINDER.

of one of his large electric traveling cranes broke a number of times, the last breakage resulting in the crane being put out of service for some weeks until a portion could be rebuilt and steel gears applied.

The severe service, however, caused even the steel gears to wear rapidly and failures were frequent, owing to the worn condition of the teeth. To obviate this difficulty, the use of manganese steel gears and pinions was introduced and found immediate favor. Being extremely hard, these gears have a correspondingly long life, the manufacturers' tests indicating that they wear fully five times as long as cut-tooth gears and pinions made of another grade of steel. While particularly suited for crane service, these gears can also be introduced with success in steel mills, foundries and other manufacturing plants where difficulty with gray iron or steel gears develops, and they are being used in great numbers in electric railway service as motor gears and pinions.

The material of which these gears are made is so hard that it cannot be cut, as are the ordinary open-hearth steel gears, by any tool steel known, and for this reason all finished surfaces, such as teeth and hub-fit, are accurately ground to templates. Although the material is hard, it is not brittle; on the contrary, it is so tough that test pieces have been bent cold through an angle of 180 degrees without showing fracture. The gear is made solid with the teeth cast in, and a special machine then grinds the periphery of the teeth to the accurate diameter. Another machine grinds each tooth to the master, while still another grinds out the hub-fit and faces both sides. A gray iron or soft steel hub is then pressed in at 35 to 45 tons' pressure per square inch and is bored out to the proper size for forcing on the axle.

The Atha Steel Casting Co., Newark, N. J., is exclusive maker of manganese steel gears and pinions, having been granted both domestic and foreign patents covering improvements in their design and manufacture. This company makes the statement that a manganese steel gear running with a manganese steel pinion will outwear at least five of the cut-tooth type of gear. With the economy thus obtained is coupled, of course, the saving of labor in replacements, the increased efficiency of the equipment, and the elimination of the noise.

WILMARTH & MORMAN SURFACE GRINDER.

The surface grinder shown in the accompanying illustrations, built by the Wilmarth & Morman Co., Grand Rapids, Mich., offers special features of adaptability through the different attachments indicated in the various views of this tool. The tool can be furnished stripped of attachments and suited for simply plain surface grinding. It can be supplied with cutter and reamer grinding attachments, adapting the tool to the grinding of large face mills, small angle cutters or reamers of all kinds, in fact, making it almost a universal type of cutter or reamer grinder. The same feature applies to equipping with the drill grinding auxiliary, which may be done by simply using an extended spindle.

The surface grinding table may be entirely hand feed or supplied with automatic feed, as desired. If supplied with the automatic feed, this may be for longitudinal movement only or both longitudinal and transverse, automatic. Where the machine is furnished as a plain hand feed machine, longitudinal movement is by means of the hand wheel at the left of the front of the knee and it is a plain rack and pinion type of feed. Transverse movement is by means of ball crank handle at the right of the front of the knee and is a screw movement indexed by thousandths. The vertical adjustment controlled by the hand wheel at the right of the knee is by means of bevel gears driving the elevating screw which operates in a bronze nut. The weight of the knee and table is carried in large part by a ball bearing on the elevating screw and is thus removed from the column bearing. Transverse feed is indexed to one-thousandths while vertical adjustment is carefully indexed to one-half thousandths.

When automatic feeds are used the drive is by means of bevel gears with a reversing clutch on the vertical shaft. The reversing mechanism is placed at the front left hand end of the saddle. The lever may be placed to hold the reversing clutch in a neutral position when desired, thus leaving a plain hand feed machine. The weight of the reversing clutch is carefully counterbalanced so as to make a free working mechanism. The transverse feed, when used, is applied by means of a friction device operated by the small hand wheel in the center of the large longitudinal feed wheel. The transverse feed may be arranged to feed in either direction at the will of the operator. The amount of feed may be also regulated

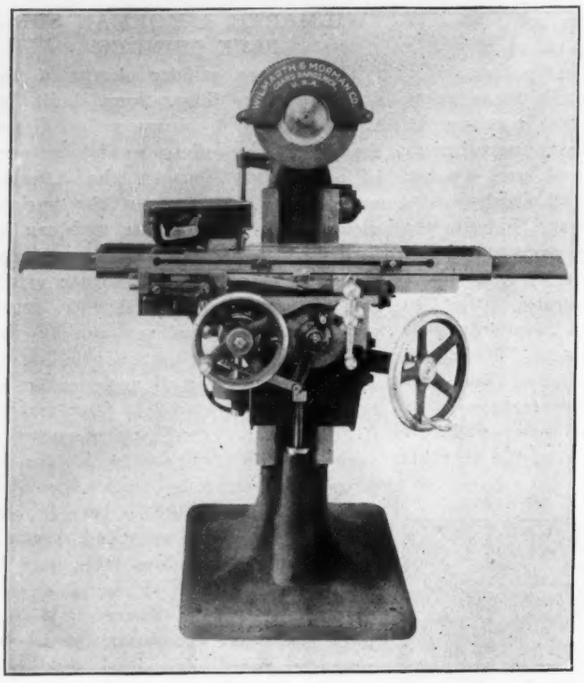


FIG. 1—FRONT VIEW OF WILMARTH & MORMAN GRINDER. THE COVER HAS BEEN REMOVED TO SHOW THE MECHANISM FOR REVERSING FEED.

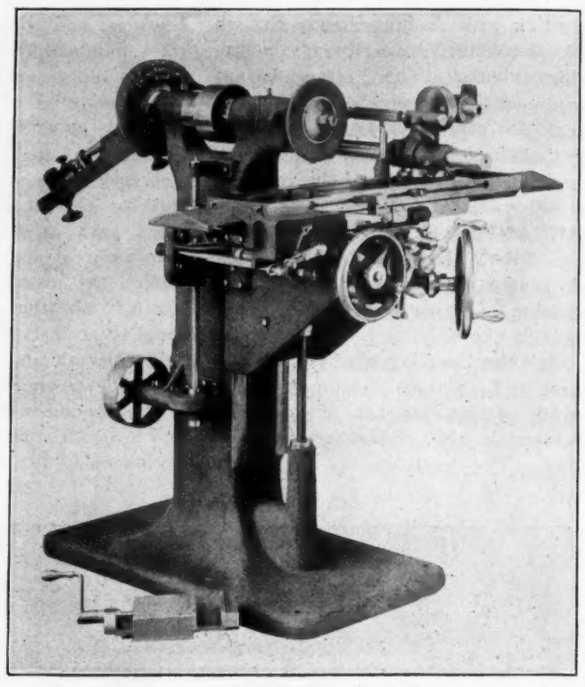


FIG. 3—VIEW OF THE GRINDER, SHOWING THE DRILL GRINDER ATTACHMENT AT THE LEFT AND THE DEVICE FOR GRINDING REAMERS AT THE RIGHT.

at will. All gears are carefully shrouded and protected both from dust and danger of injury to operator. The ways are also carefully protected from dust and grit.

The saddle is 36 inches long, giving ample bearing for the table, the travel of which is but 20 inches. The front bearing has a very sharp V way, while the rear bearing rod is broad and flat and of liberal dimensions. A gib attached to the rear of the table and sliding in it effectively prevents any tipping even though an excessive load is placed on the overhanging end of the table at its extreme limit of travel. The table size is 8 x 50 inches, and the working surface 8 x 20 inches. The machine is designed for a 10-inch diameter wheel for ordinary surface work and with a wheel of this size has a capacity for pieces of work up to 11½ inches in height. The spindle driving cone is made two step, the steps being proportioned to give the proper speeds for both 7-inch and 10-inch wheels. The 7-inch wheel is

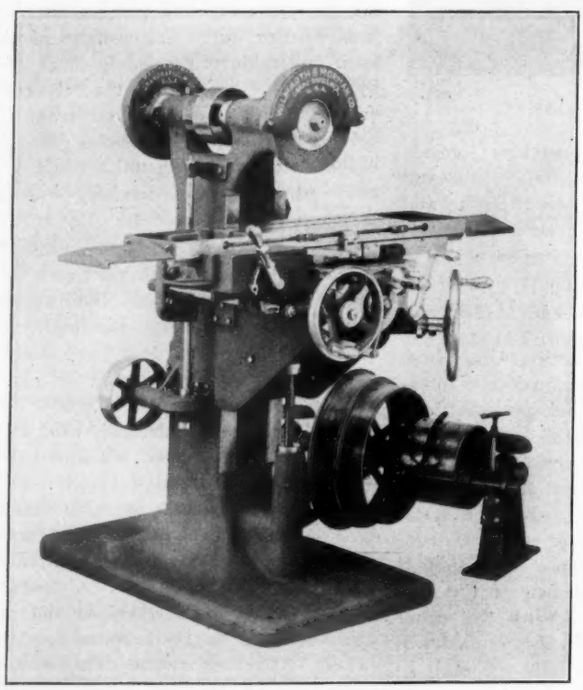


FIG. 2—VIEW OF THE GRINDER STRIPPED FOR SURFACE GRINDING ONLY.

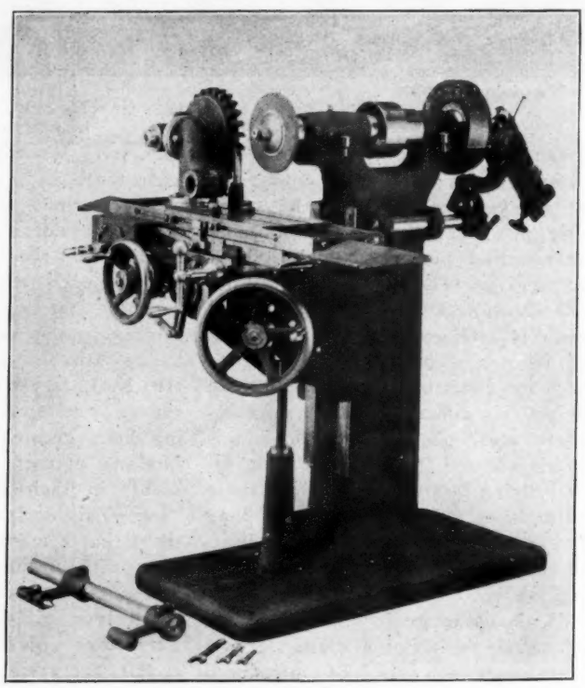


FIG. 4—VIEW OF THE GRINDER EQUIPPED TO GRIND DRILLS AND MILLING CUTTERS.

used for cutter and reamer grinding work and may be used for ordinary surfacing work where preferable. With a small wheel, work up to 13 inches may be accommodated.

The cutter and reamer grinding attachment is practically universal in its adaptability and has a capacity for handling all kinds of milling cutters including face and side mills up to 13 inches in diameter. It can be mounted on the table of the grinder with a simple placing of two bolts. When so attached it can be manipulated as thoroughly and quickly as any universal cutter grinder may. The addition of the drill grinding attachment does not interfere with the use of the surface grinder in any way, as one operator may be doing surface grinding while another may come up and sharpen his drill without the other being in the way in any particular.

Pig Iron and Currency.—The Birkinbine Engineering Offices, Odd Fellows Temple, Philadelphia, have issued a very interesting and timely pamphlet, giving a chart showing the population of the United States, currency circulation and pig iron production and value for the years 1890 to 1907. The record for 18 years shows that while the population of the United States increased 36 per cent, the pig iron output was almost trebled. The per capita production doubled and the available currency per inhabitant expanded 41 per cent, but the pig iron industry apparently demanded in 1907 nearly two and a half times as much money as in 1890. The total currency in circulation in this period expanded 94 per cent.

Duty on Drills.—The Board of United States General Appraisers has decided in a protest of Frank A. Tasker, New York, that merchandise returned by the United States appraiser as "fully finished steel twist drills" is dutiable at 45 per cent as "manufactures of metal" and not at 4.7 cents per pound for "steel in forms and shapes, not specially provided for" as claimed by the importer. The appraiser's testimony was not contradicted by any of the evidence before the board and, in that case, the drills are properly dutiable under the catch-all paragraph of the tariff for metals wholly or partly manufactured.

Notice of the shut-down of the Collinwood, O., shops of the Lake Shore railroad, to take effect May 1, has been posted, affecting 2,000 men.

NEW QUARTERS

OF THE IRON AND STEEL INSTITUTE IN LONDON.

Annual Meeting Will be Held in May.—Bessemer Gold Medal to be Awarded to Benj. Talbot.

Owing to the steady growth of the membership of the Iron and Steel Institute of England, and to the expansion of the institute library, which now contains several thousand volumes, the institute council has obtained more commodious offices in the building at 28 Victoria street, London, S. W., where it has had headquarters for a number of years. The rooms have been decorated throughout with white enamel, insuring maximum radiation of light, and thus permitting an effective display to be made of the extensive collection of portraits and pictures possessed by the institute.

There is a suite of five rooms overlooking Victoria street. The first room is fitted as a waiting room, and its most interesting feature is the large show case containing the collection of early specimens of Bessemer steel presented to the institute by Sir Henry Bessemer. Amongst other objects of interest on view in this case, are short pieces of a 100-pounder gun tube made of Bessemer steel, a 74-pounder steel projectile formed in a hydraulic rolling-mill of novel construction designed and worked by Sir Henry Bessemer, part of a Bessemer steel rail rolled at the works of the London & North-Western Railway Co., and a portion of a steel rail twisted into a complete spiral, from end to end, without producing fracture. Two interesting specimens are pieces cut from the first two rails of Bessemer metal ever rolled, the metal having been made from Blaenavon gray foundry pig at Sir Henry Bessemer's experimental works at Baxter House, London, in 1856. A sample consisting of the earliest experimental example of metal converted by the Bessemer process is also shown, the resulting ingot having been rolled at the Royal arsenal at Woolwich into flat bar. This bar was made in about the month of June, 1856, and was among the samples of Bessemer metal exhibited at the meeting of the British Association at Cheltenham on Aug. 13, 1856. With the exception of this bar, all the other samples shown on that occasion have been lost. There is also a small model gun forged from one of the first Bessemer ingots which were made at the works of Messrs. Bessemer & Co. at Sheffield. An analysis of the metal of which this gun is made was conducted by Mr. Edward Riley, when it was found that it yielded 99.787 per cent of pure iron, and was therefore equal in quality to some of the highest brands of Swedish bar iron. Another show case contains a collection of medals and of the badges which have been issued at the various meetings of the institute.

Suspended around the walls of the waiting room are portraits of Henry Cort (the inventor of puddling and of grooved rolls), George Thomas Clark (one of the trustees of the institute, 1880-1898), Alexander Thielen (vice president 1896), and Benjamin Walker (member of council, 1889-1890), together with diplomas gained by the institute at various exhibitions in which it has participated, including those of Paris, St. Louis, and Milan.

The two adjoining rooms have been thrown into one, and form a spacious council room. In a prominent position in this room stands a life-sized painting in oils, by H. T. Wells, R. A., of the seventh Duke of Devonshire, the first president of the institute. At one end of the room, is suspended a large oil painting, by Rudolph Lehmann, of Sir Henry Bessemer (president, 1872), at the period of his invention of the Bessemer process. At the other end hangs the portrait, in oils, of Edward Williams (president, 1879-81), presented to the institute by William Jenkins of Consett. The council room also contains the portraits of the past presidents of the Iron and Steel Institute, viz.:

Sir Lowthian Bell, Bart. (1873-75).
William Menelaus (1875-77).
Sir C. William Siemens (1877-79).
Edward Williams (1879-81).
Josiah Timmis Smith (1881-83).
Sir Bernhard Samuelson, Bart. (1883-85).
John Percy (1885-87).
Daniel Adamson (1887-89).
Lord Airedale of Gledhow (1889-91).
Sir Frederick Augustus Abel, Bart. (1891-93).
Edward Windsor Richards (1893-95).
Sir David Dale, Bart. (1895-97).
Edward Pritchard Martin (1897-99).
Sir William Chandler Roberts-Austen (1899-1901).
William Whitwell (1901-03).
Andrew Carnegie (1903-05).
Robert Abbott Hadfield (1905-07).

A door of communication from the council room affords access to the secretary's room, while the last room on this side of the hall is used as an office for the institute's accounts and correspondence. On the western side of the hall is a large reading room and lounge, in which members may consult current periodicals, conduct correspondence, and meet each other for conversation or consultation. Smoking is allowed, and comfortable

lounge seats have been provided, the council being desirous of encouraging members to use the room as a meeting place. On the walls of the reading room are displayed portraits of the Bessemer medallists of the institute, including:

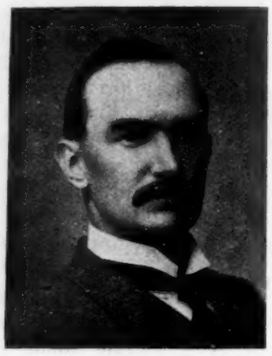
Robert Forester Mushet.
Peter Ritter von Tunner.
Peter Cooper.
Sir Joseph Whitworth, Bart.
Alexander Lyman Holley.
George James Snelus.
Sidney Gilchrist Thomas.
Richard Akerman.
James Riley.
John Devonshire Ellis.
Henri Schneider.
William Daniel Allen.
Hon. Abram S. Hewitt.
Lord Armstrong, C. B.
Arthur Cooper.
John Fritz.
John Gjers.
Henry Marion Howe.
Hermann Wedding.
Richard Price-Williams.
Henri de Wendel.
John Edward Stead.
Friedrich Alfred Krupp.
John Oliver Arnold.
Floris Osmond.
Johan August Brinell.

In this room also stands a handsome marble pedestal, surmounted by a marble bust of F. Krupp, honorary member of the institute, bequeathed by Alfred Longsden, and a bust of the late Sidney Gilchrist Thomas. Over the mantelpiece is a small bust in cast iron of Prof. A. Ledebur, honorary member of the institute.

The three adjoining rooms on this side are devoted to the library of the institute. In the last of the three provision is made for special research for the purpose of enabling members desirous of consulting works of reference, or the files of mining and metallurgical periodicals, to do so in quietness and privacy. In this room a card catalog to the library is available and the current files of some 150 technical journals are placed in boxes easy of access. The last room of this suite (the first on the right, on entering) is the general office for inquiries, etc.

The annual meeting of the Iron and Steel Institute will be held at the Institution of Civil Engineers, Great George street, Westminster, May 14 and 15. At the session of May 14, the council will present its report, there will be an election of officers, papers will be read and the Bessemer gold medal for 1908 will be presented to Benjamin Talbot, of Middlesbrough, the inventor of the well-known Talbot open-hearth furnace. In the evening, the annual dinner of the institute will be held at the Grand Hall of the Hotel Cecil. At the meeting of May 15, the awards of the Andrew Carnegie gold medal and rehearsal scholarships for 1908 will be announced and papers will be read. The following is a list of papers that are expected to be represented:

"Cast Iron in the Construction of Chemical Plant," by F. J. R. Carulla (Derby); "An Experimental Electric Furnace for the Smelting of Iron," Prof. B. Igewsky (Kiev); "The Pyrometric Installation of the Ordnance Factories, Woolwich," J. Wesley Lambert (Woolwich); "Improvements in Plate Rolling Mills," A. Lamberton, member of council; "The Application of Color Photography to Metallography," E. F. Law, Assoc. R. S. M. (London); "The Department of Metallurgical Chemistry in the National Physical Laboratory," W. Rosenhain, B.



BENJAMIN TALBOT,
Bessemer Medallist.

A. (Teddington); "The Utilization of Blast Furnace Slag for Portland Cement," C. von Schwarz (Liege); "A New Fatigue Test for Iron and Steel," T. E. Stanton, D. Sc. (Teddington); "The Physical Qualities of Steel in Relation to Its Mechanical Treatment," James E. York (New York).

Reports on research work carried out during the past year will be submitted by C. A. Edwards (Manchester), J. A. N. Friend (Germany), D. M. Levy (Birmingham), A. M. Portevin (France), A. K. F. Hiorth (Norway), B. Saklatwalla (India), E. Hess (United States), C. Benedicks (Sweden), and H. C. Boynton (United States), Carnegie Research Scholars.

The council has accepted a cordial invitation to hold the autumn meeting of the institute in Middlesbrough on Sept. 29 and following days. The institute met last in Middlesbrough 25 years ago.

The Canadian Mining Institute, which is arranging for an excursion in September, 1908, to the mineral areas of eastern Canada, including the silver cobalt region, the nickel mines and the iron ore mines of Ontario, has extended to the members of the Iron and Steel Institute a cordial invitation to take part in this excursion.

Benjamin Talbot, the inventor of the continuous process of making steel which bears his name, was born in 1864, and came to the United States in 1890. He first managed a steel works at Chattanooga, Tenn., and in 1893 went to the Pencoyd works at Philadelphia as manager. In 1900 he returned to England to introduce the continuous process which he had meanwhile invented. He has also invented a mechanical gas producer and has made several improvements in open-hearth and reheating furnaces. In May, 1900, he read a paper before the institute, describing his continuous process.

Detroit Foundrymen Organize.—At a recent meeting of Detroit, Mich., members of the American Foundrymen's Association, the Detroit Foundrymen's Association was formed, starting with a membership of about 50, with indications of its being a great success. The following officers were chosen: President, W. M. Corse, of the Detroit Lubricator Co.; vice president, J. J. Wilson, of the Cadillac Motor Car Co.; secretary, A. P. Henry, of the Standard Pattern Works, and treasurer, A. T. Waterfall, of the Russel Wheel & Foundry Co. The executive committee includes the president and vice president, and the following: James S. Keightley, of the Great Lakes Engineering Co.; Thomas F. Meek, of the Detroit Steel Casting Co., and W. T. Putnam, of the Detroit Testing Laboratories.

Moved Into New Plant.—The Standard Welding Co., Cleveland, has just moved into its new plant at West Seventy-sixth street and the Lake Shore tracks. The buildings are all of brick and steel construction. The main building is three stories high, 50 x 450 feet. The saw tooth structure attached is 75 x 450 with basement. The power house is equipped with 1,500 horsepower boilers and engines, automatic stokers, coal and ashes handling systems, etc.

The recent meeting of the stockholders of the American Steel Foundries was adjourned to May 7. An officer of the company is authority for the statement that about 90 per cent of the capital stock has been deposited or applied for deposit in favor of the plans for reducing the corporation's capitalization. It has been difficult to locate some of the stock and this caused delay.

THE PRICE MAINTENANCE POLICY

Editor IRON TRADE REVIEW:

Your article under the editorial head, "Shall We Have Regulated Competition, or Ruinous Trade Warfare?" has undoubtedly been studied very carefully by your readers.

The writer, while agreeing with you in the main, begs to differ in a few details which appear to be minor, but which, in my judgment, are the foundation of the whole scheme.

It is a very simple thing for our large interests to get together, pass resolutions to maintain the status quo as to prices on all material of their own manufacture, and fail in these resolutions to also protect the price of the material handled by their smaller neighbors.

The proclamation is then given to the Associated Press that prices of ore and finished products are reaffirmed.

These same large interests, through their buyers, notwithstanding this proclamation, continue to use all the tricks of the buyers' trade to hammer down the prices of material that they purchase. "Consistency, Thou Art a Jewel."

What is the result? The smaller neighbor must cut his price below cost and look to a reduction of the wage scale to save him from his creditors.

He therefore looks with skepticism on the reaffirmation of prices or places such action in the same class with the sayings of those who "talk through their hats."

The passing of resolutions is not a medicine which will reach the affected part.

We are now in the trough of the financial wave and every one must assist his neighbor and not stand on his neighbor's head to get a better view beyond.

It is probable that our large interests think that they only should be protected; that the small manufacturer plays no part in schemes of finances, or do our large interests believe that they are the selected few who have, like the servants in the parable, been entrusted with the funds of their master and therefore are imbued with the sacred desire to reap the profits even at the expense of our business life, so that the Master will say, "Enter Thou?"

Why is it that the great ore producers do not bear their share of the burden and get down in the trough of the wave so that all will come out together united in strength and business confidence?

Does the average business man believe that the furnace interests requested that the price of ore for 1907 be maintained for 1908? Certainly they do, but they wink knowingly and understand.

The only way in my opinion to get confidence restored and for the renewal of business activities is for every one to bear his fair share of the disaster; getting the price of raw material down where it ought to be and where every business man expects it to be and has a right to demand it be placed; then business will resume and until such time we all will be waiting as patiently as our financial condition will warrant, but waiting just the same.

I therefore suggest that we have regulated competition not with ruinous discrimination.

W. D. SAYLE.

Cleveland Punch & Shear Works Co., Cleveland, April 15.

The Price of Billets.

Editor IRON TRADE REVIEW:

In connection with your main editorial, pages 670 and 671, your issue of April 9, we beg to say that a portion of our business consists in the rolling of steel billets into bars, and converting the bars into track bolts. When business is very good the large manufacturers tell us that they have little or no billets for sale and only for deferred deliveries. The high tariff eliminates purchasing abroad. When business is very poor the large manufacturers maintain approximately the high price on billets and the Illinois Steel Co. reduces the price on track bolts many dollars per ton.

We are but a small concern, employing only 700 men, and in a nonferrous locality. Perhaps there are others.

SOLOMON STODDARD.

Kansas City Bolt & Nut Co.
Kansas City, Mo.

The American Rolling Mill Co., Middletown, O., is circulating an interesting leaflet regarding "American Ingot Iron." This product is a noncorrosive sheet of guaranteed iron analyses rolled from iron made in ingot form by special process. The basis of the claim to superiority is in the development of a low manganese iron in which also other impurities are reduced to a minimum, thus reducing the electrolytic action of the elements and consequent corrosion.

NEW SHAFTING PLANT.

Cumberland Steel Co. Expects to Be Able to Fill Orders Shortly.

The construction of the plant of the Cumberland Steel Co., Cumberland, Md., for the manufacture of turn and round shafting has been almost completed by the McClintic-Marshall Construction Co., Pittsburg. The Cumberland company expects to be in a position to fill orders in from four to six weeks.

The new building has a frontage on William street of 227 feet, a depth of 283 feet, and is ell shaped. The shafting works is 84 x 258 feet, one story and basement; storage and shipping department, with basement, 78 x 143 feet; boiler room, 43 x 74 feet; boxing and lumber room, 25 x 83 feet. The building is of brick and steel construction, with reinforced concrete floors five inches thick on I beams five feet centers and a turret the full length of the building. The roof is of reinforced concrete, with three-ply paper and gravel covering. Traveling cranes cover the entire shafting works, storage racks and shipping department. Special steel racks, 180 feet long and 8 feet high, have been installed for the storage of shafting, with a capacity of over 5,000,000 pounds. The principal machines for turning, grinding and straightening were made by Merwin McKaig from new and improved designs furnished the company by W. J. Muncaster, M. E. These machines are considered among the best ever designed for the rapid and accurate measurement of shafting.

Large Brick Contract.—The Harbison-Walker Refractories Co. has closed a contract with the trustees of the Carnegie Technical Schools of Pittsburg for over 2,000,000 high grade light colored front building brick, for use in the erection of the large group of buildings founded through the generosity of Andrew Carnegie. About three years ago the Harbison-Walker company located a special plant at Templeton, Pa., for the manufacture of this high grade building brick exclusively. Quick delivery was a most essential point in the placing of the above contract, and through the large capacity of the Templeton plant the company is enabled to comply with this requirement.

The Alice furnace of the Youngstown Sheet & Tube Co. closed down at Sharpsville, Pa., April 16 for an indefinite period. Extensive repairs will be made on the stack.

INDIVIDUAL GRIEVANCES

Are Not Fit Subjects for Strikes, Says Massachusetts Supreme Court.

The sympathy strike against the open shop was declared illegal, April 3, in the decision of the Massachusetts supreme court in the case of Reynolds et al. vs. the Building Trades Council at Lynn, comprising several labor unions. The Lynn Building Trades Council undertook to decide each case of an individual grievance between an employe and his employer, and to decree what shall be done by the employer as well as the employe, and to force compliance with its decision by threats and by instituting a strike in which all the members were bound to join. The court holds such interference with the employer's business not justifiable. In specific terms the court declared that the strike in question was against the open shop and for the closed shop, and adds:

"In our opinion the facts were abundantly proved which made the strike an illegal combination—that is, an interference with the business for which interference there was not a justification. The occasion of the strike was the posting of the open shop rule. The strike was manifestly a strike against working under these rules.

"We do not mean to say that a labor union cannot combine to support a committee to take up individual grievances in behalf of the members. What we now decide to be illegal is a combination that such grievances (that is to say, grievances between an individual member of a union and his employer, which are not common to the union members as a class) shall be decided by the employes, and that decision enforced by a strike on the part of all."

Labor Notes.

The Canadian Pacific railway on April 21 posted notices at all shops operated by the company, from Fort William to Vancouver, that thereafter the open shop policy would prevail. Four thousand mechanics are affected.

The machinists employed in the shops of the Iowa Central railroad, at Marshalltown, Ia., struck, April 22, together with helpers and apprentices. A reduction of 4c per hour in the new wage scale caused the strike.

Statistics prepared for the General Managers' Association show 345,000 men laid off by the railroads since Oct. 1. The actual figures of 17 larger roads show 104,000 men laid off since June, a decrease of 18 per cent.

An injunction was granted in the Westmoreland county, Pa., court on the prayer of the Aluminum Co. of America, against 22 strikers, members of various unions. The Aluminum company declared the strikers interfered with non-union workmen.

Practically one out of every three union workmen in New York state was idle at the close of 1907, according to the quarterly bulletin of the state labor department, just made public. In New York City the percentage was 34.2, as compared with 32.7 for the rest of the state.

The labor dispute which has existed since last September between the Badger Brass Mfg. Co., Kenosha, Wis., and its employes, was settled when the employes decided to accept the proposition of the company allowing the return of the employes, but the company will maintain the open shop.

After delivering an exciting address on unionism at New Decatur, Ala., J. D. Buckalew, third vice president of the International Association of Machinists, was arrested on a warrant charging defamation of character, by John Roberts, an employe of the Louisville & Nashville railroad in the local shops. Buckalew furnished bond for his release.

Rather than subject its 200 furnace employes to idleness because of the depressed state of the iron market, the R. Heckscher & Sons Co., Norristown, Pa., posted notices the first of the month of a reduction in wages ranging from 10 to 33 1/3 per cent, in addition to the 10 per cent reduction last fall. The reduction affects every worker, from the superintendent down.

Announcement is made by the National Founders' Association that the Molders' Union has called off the Philadelphia strike unconditionally, and that all proprietors have uniformly declined to consider the applications of any of the 600 strikers until such time as the independent men have been taken care of. The strike is said to have cost the union approximately $125,000 in strike benefits alone, and a wage loss of approximately $350,000, making the total loss about $475,000.

Citizens Only.—Following the lead of the Pennsylvania Railroad Co., the Federal Furnace Co. and the firm of Coats & Burchard, Chicago, have posted notices to the effect that after May 1 no person not a citizen of the United States will be employed. It is said that a number of other big Chicago plants are preparing to issue similar orders.

IN NEW PLANT.

Berg Brick Machinery Co., Ltd., Makes Purchase of Toronto Site.

A. Berg & Sons, Toronto, Can., whose incorporation as the Berg Brick Machinery Co., Ltd., was noted several weeks ago, has purchased the works in Toronto lately operated by the Canadian Ship Building Co., and before that by the Bertram Engine Works. The plant includes a machine shop, foundry, pattern shops, blacksmith shop and boiler shop, with railway sidings throughout the buildings and yards and with a good water front. Anton Berg has had many years' experience in the manufacture of brick machinery, and is the inventor of the Berg brick press. Associated with him are his two sons, John and Severen Berg, both practical machinists and mechanical engineers.

The Berg company has been manufacturing the Berg press with all equipment for the last three years, and has sold and installed 21 of its plants in Canada. In the new plant, of which it has recently taken possession, it will be equipped to manufacture the Berg press for all kinds of pressed brick work, stiff mud machinery, sewer pipe machinery and paving brick machinery, including dry pans, pulverizers, rolls, etc.; Corliss engines from 75 to 300 horsepower; all sizes of slide valve engines from 35 to 200 horsepower; also boilers, gas producers, gas and gasoline engines.

OREGON IRON PLANT.

The Nelson Iron Works, at Marshfield, Incorporates Its Growing Business.

The Nelson Iron Works, Marshfield, Ore., founded a number of years ago by F. E. Nelson, who is its owner and manager, has been organized as a corporation under the laws of the state of Oregon. The corporate name is the Nelson Iron Works, and the authorized capital is $50,000, mostly paid up. The officers of the company are: President, F. E. Nelson; vice president, J. W. Bennet; treasurer J. M. Nelson, and secretary, W. F. McKee. The management will remain unchanged.

The business grew rapidly from a small beginning, and for several years it has included a machine shop, well equipped with modern machinery; a foundry, in which has recently been installed a new cupola with double the capacity of the old one, and a pattern shop. The lines manufactured by this company include gas engines, saw mill and logging machinery and tools, car castings, marine work and special machinery of various kinds.

Bond Sale Lifts the Market

In decided contrast to the dull opening Monday was the conduct of the market the remainder of the week. Monday's close found prices lower, but, although $500,000 in gold was engaged for export, money rates were easy. Tuesday's heavy purchases of Steel common lifted the price and other stocks advanced in sympathy. Then came the first rumor of a proposed issue by the Pennsylvania railroad of the $40,000,000 long time 4 per cent bonds. Instead of a sharp decline in the market, the report caused a general uplift, which was even more pronounced the following day. The authoritative announcement was made that the Pennsylvania loan was for 40 years, was to be issued to subscribers at 96, had been underwritten by the strongest American-European banking combination in years and that it was secured by the main line of the company from Pittsburg to Philadelphia, also pledging of the lease of the Philadelphia-New York line together with securities estimated at $50,000,000. The Pennsylvania issue is held as marking the first substantial return to the "old-fashioned," but healthy, method of giving real security for loans instead of many frilled "bonds," such as have brought like issues into discredit with the purchasing public. Pennsylvania stocks advanced in face of the loan and the entire market was lifted, stocks touching the highest points of the year. The improvement was not to be stayed by announcements of four bank failures in various parts of the country and was rather accentuated by the suspension of a New York stock brokerage house which had been known as a "bear" house.

The money rates continued easy, call money ranging from 1½ to 2 per cent and time money ruling the lowest in two years. The weekly bank statement was exceptionally favorable, showing an increase of $10,334,800 in cash and $9,011,325 in surplus reserve. The total surplus now stands at $54,984,750, the highest since 1894. Loans decreased $5,210,700 and total deposits exceed total loans by $60,000,000. The bond market was conspicuously active, especially railroad and municipal bonds. The times and money market conditions are considered particularly auspicious for offering bonds by the railroads the proceeds of which sales will be employed in making much needed purchases of rails and other material. However, the outcome of certain of these proposed bond sales will be awaited with much interest. The investing public appears to be following the usual after-panic movement of investing in high grade bonds rather than stocks. The total amount of shares dealt in on the New York exchange was 2,851,640, compared with 1,167,400 for the short week previous, and 3,421,400 for the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $23,674,000, compared with $12,530,000 last week, and $7,246,000 the corresponding week last year.

New York.—Amalgamated Copper closed 60¼, a net gain of 2⅜.

Financial Notes.

The Pullman Co. declared a quarterly dividend of $2 per share; the Pennsylvania Steel Co., the regular semi-annual dividend of 3½ per cent on preferred stock, payable May 1; the Pressed Steel Car Co., the regular quarterly dividend of 1¾ per cent on preferred stock, payable May 27; the National Carbon Co., regular quarterly dividend of 1¾ per cent on preferred stock, payable May 15; the J. G. Brill Car Co., quarterly dividend of 1½ per cent on common stock, payable June 16, also the regular quarterly dividend of 1¾ per cent, payable May 1; the Warwick Iron & Steel Co., semi-annual dividend of 3 per cent, payable May 15.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Apr. 25	Changes in Week	Date 1908 Ann. M't'g	Stock Outstanding	Dividend Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	8⅝	+ ⅛	Sept. 3	19,820 000			
Allis-Chalmers pr	20⅝	+ ⅛		16 150.000	7 cum	1¾ Q.	Feb., 1904
American Can	5¼	+ ¼	Feb. 3	41.233.300			
Am. Can pr	55	+3½		41,233,300	7 cum	1¾ Q.	April, 1908
Am. Car & Foundry	84	+ ⅞	June 25	30,000,000		1 Q.	April, 1908
Am. Car & Fdy. pr	94⅞	+ ⅜		30 000,000	7 n. c.	1¾ Q.	April, 1908
American Loc	46½	+1¾	Oct. 20	25,000,000	5	1¼ Q.	May, 1908
American Loc. pr	97	+4½		25 000.000	7 cum	1¾ Q.	April, 1908
American Ship	40¼	— ¼	Oct. 14	7 60 .000	4	1¼	April, 1908
American Ship pr	94	.....		7,900,000	7 n. c	1¾ Q.	April, 1908
Am. Steel Foundries	6¾	+ ⅜	Oct. 6	15 810 000			
Am. Steel Foundries pr	34	+3⅞		17,240.000	6 cum	2½	Aug., 1904
Barney & Smith	50	.....	June 2	2.000.000	4	1 Q.	Sept., 1907
Barney & Smith pr	90	.....		2.500 000	8 cum	2 Q.	Mar., 1908
Bethlehem Steel	15	— ⅜	April 7	14,882,000			
Bethlehem Steel pr	36	−2		14 908 000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	29¾	+ ⅛	March 17	45,000.000*	6	1½ S. A.	Feb., 1903
Cambria Iron	45½	— ½		8,468.000*	4	2 S. A.	April, 1908
Chicago Pneumatic Tool	22⅛	.....	Feb. 17	6,145,800	4	1 Q.	Oct., 1907
Colorado Fuel	24⅝	+ ⅛	Oct. 19	34 235 500		3¼	April, 1902
Crucible Steel	5⅛	+ ⅛	Oct. 21	24,578 400			
Crucible Steel pr	37¼	.....		24,436.500	7 cum	1 Q.	Dec., 1907
Empire Steel	8	.....	Feb. 26	1,254,770			
Empire Steel pr	40	.....		2 500.000	6 cum	3 S. A.	Jan., 1907
Fay & Egan	100	.....	Feb. 18	1,000.000	6	1½ Q.	July, 1907
Fay & Egan pr	110	.....		1,00 000	7 cum	1¾ Q.	Aug., 1907
General Electric	134¾	+ ¾	May 12	65,167,400	8	2 Q.	April, 1908
Harbison-Walker	10¼	.....	Jan. 20	18,000,000		½	Oct., 1907
Harbison-Walker pr	65	— ½		9,6 0,000	6 cum	1½ Q.	April, 1908
International Pump	24½	+1	June 2	17,787.300		1	April, 1905
International Pump pr	70	−1¼		13,835,000	6 cum	1½ Q.	Feb , 1908
Lackawanna Steel	34	−1	March 11	34,971 400		.....	.....
Lake Sup. Corp	8	−1	Oct. 7	40,000,000			
New York Air Brake	70½	+1½	June 18	8 012,500	8	2 Q.	Oct., 1907
Niles-Bement-Pond	130	....	Feb. 5	8,500 000	6	1¾ Q.	Mar., 1908
Niles-Bement-Pond pr	100	.....		2.000,000	6 cum	1¾ Q.	Feb., 1908
Otis Elevator Co	32	.....	March 16	6 156,600		1½ S. A.	April, 1908
Otis Elevator Co. pr	82	.....		5 449,500	6 n. c.	1½ Q.	April, 1908
Penn. Steel	60	.....	May 11	10,750 000			
Penn. Steel pr	93	.....		16,5 0 400	7 n. c.	3½ S. A.	Nov., 1907
Pittsburg Coal Co	11⅜	+1¾	Feb. 10	28,853.400			Nov., 1906
Pittsburg Coal Co. pr	41⅝	+2⅝		27,030.800	7 c.	1¾	April, 1905
Pressed Steel Car	27¼	+3¾	Feb. 19	12,500,000		3	Aug., 1904
Pressed Steel Car pr	82¼	+3¼		12,500.000	7 n. c.	1¾ Q.	Feb., 1908
Pullman	159	+5	Nov. 11	100 000.000	8	2 Q.	Feb., 1908
Railway Stl. Spring	34	+1	March 5	13,500,000	4	2 S. A.	April, 1908
Railway Stl Spring pr	75	.....		13,500,000	7 cum	1¾ Q.	Mar., 1908
Rep. Iron & Steel	18	.....	Oct. 21	27,191.000			
Rep. Iron & Steel pr	67⅞	— ⅛		20,416,900	7 cum	1¾ Q.	April, 1908
Sloss-Sheffield	45	+1⅛	March 11	10,000,000	5	1¼ Q.	Mar., 1908
Sloss-Sheffield pr	89½	.....		6,700.000	7 n. c.	1¾ Q.	April, 1906
U. S. Pipe & Fdv.	25⅝	+ ⅝	June 24	12,500,000	4	1 Q.	Dec., 1907
U. S. Pipe & Fdy pr	71¾	+2¾		12 500,000	7 n. c.	1¾ Q.	Mar., 1908
U. S. Steel	36⅛	+1⅛	April 20	508,302,500	2 n. c.	½ Q.	Mar., 1908
U. S. Steel pr	100⅝	+1⅛		360,281,100	7 cum	1¾ Q.	Feb., 1908
U. S. Steel 5's	97	+1		463,798.000	5	5 A.	.....
Va. Iron. Coal & Coke	50	+5	Nov. 17	9,073 680			
WestinghouseElec	56¾	+ ½	June 24	23 933.200*	10	2½ Q.	Oct , 1907
WestinghouseAir Brake	99⅜	— ⅛	Oct. 6	11.(00,000*		2½ Q.	April, 1908

Par value of shares, $100, except those starred (*), $50

Boston.—Butte Coalition closed 21¾, a net gain of 1⅜; Calumet & Arizona closed 101½, a net gain of 2⅜; Calumet & Hecla closed 635, a net gain of 10; North Butte Mining closed 54½, a net gain of 2¼; Quincy Mining closed 83, a net gain of 1.

NEWS FROM MANY INDUSTRIES

New Buyers:—

Charles J. Vigt, Martin Scheeler and Ferdinand Grimm, all of Buffalo, have incorporated the Buffalo Galvanizing & Tinning Co., with a capital stock of $26,000.

Daniel Dow, A. G. Schultheis and R. W. Dow, all of Grand Forks, N. D., have incorporated the Grand Forks Foundry & Machine Co., Grand Forks, N. D., capitalized at $50,000.

The Smith Automatic Valve Co., Boston, has been incorporated with capital of $60,000. The incorporators are Angus J. Smith, Daniel Livingston and Jonathan Perry.

William J. Hart, Thomas E. Cook, H. W. Canfield, H. H. Canfield, and Rose A. McManamon, Cleveland, have incorporated as the McGraw Foundry Co., with an authorized capital of $2,000.

The Gas Power Machinery Co., Cleveland, has been chartered by the following: James Z. George, C. E. Linsell, Tarver George, L. E. Linsell and B. J. Guthery. The capital stock is $10,000.

The Union Iron & Metal Co., Boston, has been incorporated for $10,000. Incorporators are Matthew T. Denham, Sheldon L. Howard and Edward T. Turner.

The Gowanus Roofing Co., Brooklyn, N. Y., sheet metal and roofing, has been incorporated by Frank Roberts, George Gildersleeve and Amos Gildersleeve, 1563 Fifty-eighth street, with a capital of $5,000.

Heacock & Lawrence Iron Works, with its principal office at Portland, Ore., has been incorporated by M. E. Heacock, E. D. Lawrence and R. A. Heacock. The capital stock has been placed at $20,000.

A charter has been granted to the Greenville Iron Ore Co., Greenville, Mo., through Paul Fayne, A. J. Vanstrum, and T. S. McQueen. The capital stock of the new corporation is $100,000.

Articles of incorporation were filed by the Kelly Tool Co., Cleveland, whose capital stock is $5,000. John Muth, Edward H. Remde, Dexter E. Perin, William E. Kelly and Alfred J. Gaining are the incorporators.

With an authorized capital of $15,000, the Odell Mfg. Co., Cleveland, has filed articles of incorporation. Those interested in the new enterprise are: A. S. Anderson, W. E. Shiels, O. S. Vinton, W. D. Shield and Floyd Dull.

Articles of incorporation have been filed by the International Forge & Tool Co., Guthrie, Okla., with $80,000 capital. The directors are: P. E. Rea, of Comanshie, Tex., H. O. Gerbrant, of Chicago, and A. A. McMahan, of Oklahoma City.

The Western Smokeless Locomotive Co., Wilmington, Del., has been incorporated with a capital of $1,500,000, by Edward R. Dunham, 1 Broadway; Michael F. Burns, 26 Cortlandt street; Richard H. Mitchell, 38 Park Row, all of New York City.

Oakley & Jansen Machinery Co., Parkersburg, W. Va., has been granted a charter to manufacture machinery, with a capital of $50,000. Norton L. Upson, E. N. Jansen, G. F. Oakley, S. E. Drumwood and C. N. Upson, all of Parkersburg, are the incorporators.

The Guthrie Iron Metal Co., Guthrie, Okla., with $5,000 capital stock, has been incorporated by W. H. Buris, William Copeland, J. H. Milan, J. C. Gurney and J. R. Edmonds, of Guthrie, Okla.

With an authorized capital of $10,000, of which one-half is paid, the H. A. Fuller Iron & Steel Co., St. Louis, Mo., has been incorporated by the following, for the purpose of conducting a general railway supply business: A. D. Fuller, Lyle Garrison and H. A. Fuller.

The "Mac" China Lock Co., New York City, has been incorporated to manufacture hardware and hardware supplies, with a capital of $10,000. Those interested in the new enterprise are: H. C. Mitchell and L. B. Whieldon, 60 Wall street, and G. A. Kaven, 45 Broadway, all of New York City.

The Concrete Interlocking Steel Corporation, New York City, to manufacture building materials, machinery, engineering appliances, etc., has filed articles of incorporation through the following: Anson W. Anderson, Walter H. Wilson, 23 Wall street, and Edmond G. F. R. Du Mazuel, 41 Wall street, all of New York City.

The New York Rotary Fire Hose Drier Co., New York City, to manufacture tools, machinery, etc., used in the hose and general rubber business, has been incorporated with a capital of $100,000, by William B. Carlton, Frederick C. Peterson and Clyde W. Miller, 110 West Thirty-fourth street, New York City.

The R. W. Herfurth Co., Hartford, Conn., is being incorporated, with authorized capital of $125,000. It will manufacture machinery, tools, automobiles and bicycles and will take over and use various patents of R. W. Herfurth. The incorporators are R. W. Herfurth, George Surand and Benj. S. Morehouse, all of New York.

Articles of incorporation have been filed by the Herculeven Co., New York City, to manufacture motors, engines, cars, boats, etc., with an authorized capital of $50,000. The incorporators are Fred K. Felt, 2112 Beverly Road, Brooklyn, N. Y.; E. B. Goding, 272 West 113th street, and Sharon Graham, 527 West 121st street, both of New York.

The New Century Novelty Co., Jersey City, N. J., hardware and hardware supplies, has been chartered by the following, with a capital of $100,000. Charles A. Limeburner, 79 Danforth avenue; George Henry Renker, 127 Danforth avenue, both of Jersey City; William T. Runyon, 104 South Twelfth street, Newark, N. J.; William R. Moore, 103 North Fourteenth street, East Orange, N. J., and Henry L. Washburn, 100 William street, New York City.

The Estelle Iron Co. has filed an application for a charter with the county registrar at Chattanooga, Tenn. The incorporators named are E. M. Jones, John H. Hill, Spencer S. Marsh, S. D. Cole and S. M. Chambliss. The capital stock is placed at $120,000. The purpose of the concern is to manufacture iron implements, own lands and iron mines, and transact all other business in keeping with a company organized to carry on an iron manufactory trade.

The General Machinery Co., Cincinnati, has been incorporated by Joseph M. Benz, John Kuhn, John Braurer, Adam Benz and Alfred J. Benz, with a capital of $10,000. The company has leased the foundry building recently vacated by the American-La France Engine Co., Cincinnati. It has planned to commence operations about May 1, and will manufacture light machine tools.

The Iszard-Warren Co., with a capital of $50,000, has been incorporated by Charles F. Iszard, J. Henry Warren and Planton Middleton, to engage in the manufacture of engineering instruments and supplies, at 1122 Vine street, Philadelphia. Machine shop equipment will be installed.

Architects Milton & Sadler, Janesville, Wis., will receive from May 1

to May 20 bids for the structural iron and sheet metal work for the construction of a two-story brick church to be erected at Reedsburg, Wis.

Articles of incorporation were filed by the Wisconsin & Minnesota Bridge Co., Superior, Wis., to build a bridge across the St. Louis river for railroad trains, street cars, vehicles and foot passengers. The capital stock is $100,000, and the incorporators are: Louis K. Luse, Lyman T. Powell and Claude Z. Luse.

New Construction:—

The Central Radiator & Foundry Co., Paolo, Kans., has completed the installation of machinery and began operations April 9.

The Waterbury Mfg. Co., Waterbury, Conn., maker of brass goods, is making plans for large addition. Several new buildings will be built of brick, probably six stories high.

The Malleable Iron Co., Dayton, O., has taken out a building permit for the construction of a two-story concrete building on its site on West Third street.

The C. G. Garrigus Machine Co., Bristol, Conn., just organized, with $50,000 capital, has bought land for a new plant. The main building will be three stories high, 36 x 70. The concern will make special machinery.

Contract for the iron work on the new brick foundry to be built in Milwaukee by the Milwaukee Bronze Casting Co., Milwaukee, has been awarded to the C. Colnik Mfg. Co., and the sheet metal contract was given to Hoffman & Baur, both of that city.

The Crucible Steel Co. of America has purchased land at 117-119 West Washington street, Chicago, and will build a three-story building of brick and stone and structural steel 60 x 151 feet. The land cost about $50,000, and the proposed new building will cost about $75,000.

The Tindel-Morris Co., Eddystone, Pa., has begun the erection of a new pattern storehouse 30 x 40 feet, using the material of the old forge shop. Hess & Co., Philadelphia, have begun placing contracts for the structural iron for the company's new forge shop, which will be steadily pushed to completion.

The American Brass Mfg. Co., Cleveland, has awarded contracts for the erection of a new foundry and machine shop at East Forty-ninth street and Luther avenue N. E. The foundry will be one story in height 40 x 144 feet, and the machine shop will be two stories high, 35 x 135 feet.

The Metallic Alloys Co., 101 John street, New York, has completed and begun the operation of its new plant at Elkton, Va., where it has acquired extensive properties. The new plant has a daily capacity of 30 tons of ground ferro-manganese, ferro-silicon and manganese-oxide. The company has recently opened up new manganese mines near Lynchburg, Va.

The West Virginia Rolling Mills Co. is completing its plant at the eastern branch of the Elizabeth river, Norfolk, Va., and, it is expected, will begin operations within 30 days. The mills will manufacture bars for reinforced concrete construction, rails, cotton ties and other light steel products, and will have an estimated daily output of about 200 tons.

The Reading Iron Co., Reading, Pa., is preparing to move the office of the Scott works into the new erecting shop. The company purposes to build a new building of cement and iron on the site of the present offices. The machinery for the new erecting shop will be placed in position some time during the present year. It will be driven by electric motors, power being supplied by the company's own power plant.

The Buckeye Steel Casting Co., Columbus, O., announces that it will begin the erection of a large pattern shop fitted with the latest machinery for the work of pattern making. The company proposes to engage in the making of large steel castings for various concerns, and plans later the erection of a large modern machine shop to finish these castings, it being designed to make the company independent of demand from equipment companies for couplers, and enlarge its line of trade.

The manufacturing plant of the Kennedy Valve Co., Coxsackie, N. Y., is being stripped of its lathes, machines, etc., which are being shipped to the company's new plant at Elmira.

The Dodd Steel & Iron Works, Des Moines, Ia., is erecting a manufacturing plant 40 x 80 feet, which will be ready for occupancy April 30. Part of the machinery, including motors and drills, is being installed. The new company will do engineering work and manufacture structural steel.

The frame erecting shop of the Lloyd-Booth plant, Youngstown, O., of the United Engineering & Foundry Co., is being replaced by a brick and steel structure. With the new addition, the erecting shop capacity will be increased 40 per cent. A new 30-ton electric traveling crane will also be installed in this part of the plant.

M. Braudy & Sons, Grand Rapids, Mich., dealers in new and second hand machinery and erectors of factory and foundry buildings, have purchased 15 acres in Detroit for the factory which will be erected there. The firm has bought the plant of E. Bement & Sons, Lansing, which will be dismantled and shipped to Detroit, to be rebuilt for Braudy & Sons' own use.

General Industrial:—

The Jordan Co., Windham, Conn., is increasing its capital from $54,000 to $100,000.

The Faeth Iron Co., of Kansas City, Mo., has increased its capital stock from $200,000 to $225,000.

The Independent Harvester Co., Peoria, Ill., has filed an amendment to its charter changing its name to the Independent Harvesting Machine Co.

The Davis-Kelly Co., Louisville, Ky., dealer in iron, steel and machinery, has filed a petition in voluntary bankruptcy, listing liabilities at $48,731.50, and assets at $33,105.22.

The Northern Construction Co., Milwaukee, has awarded the contract for the iron work on the addition to the federal building at Duluth, Minn., to the National Iron Works, Duluth.

H. G. Bye, Youngstown, O., receiver of the Keystone Steel Co., a West Virginia corporation doing business at Sebring, O., has given notice to creditors to file statements of accounts by May 2.

The McVoy Tub, Pail & Packing Co., Minneapolis, Minn., advises that the damage done to its plant, recently noted, was not serious; that repairs have been completed, and the plant is again running.

The Columbus Structural Steel Co., Columbus, O., has been awarded the contract for 500 tons of material to go into the construction of the addition to the federal building in that city.

The Parks rolling mill property, Cowentown, Md., owned by Clarence Steel, was recently sold to the Newark Electric Co., which will erect a hydro-electric plant to supply the town of Newark, Del., with electric power.

Fred E. Lane, Cleveland, formerly president of the Lane Tool Co., which was recently purchased by the Massillon Foundry & Machine Co., is superintending the removal of the Cleveland plant to Massillon, O.

Thomas F. Carey, Roxbury, Mass., dealer in railroad supplies and machinery, and street railway constructor, has filed a voluntary petition in bankruptcy, with liabilities amounting to $614,233, and assets, $13,722.

The Dean Gas Engine & Foundry Co., Newport, Ky., manufacturer of gas engines, has made an assignment, naming James C. Wright as trustee. The assets will aggregate $30,000. No statement of liabilities is filed.

The following directors of the Juargua Iron Co., mining ores in Cuba, were recently elected: C. Austin Buck and Berry H. Jones, South Bethlehem, Pa.; E. C. Grace, Archibald Johnson and Henry S. Snyder, South Bethlehem, Pa.

The unfinished orders of the D. C. Patten Co., Sycamore, Ill., have been turned over to the Sterling Machine Works, Sterling, Ill., by the United States district court of northern Illinois. The Patten company is in the hands of a receiver.

F. J. Nutting has sold his half interest in the Los Angeles, Cal., Ornamental Iron Works to M. C. Mason. The new owner announces that arrangements have been made to double the capacity of the plant and increase the capitalization of the company.

The board of directors of the Alexandria Iron Works, Alexandria, Va., has elected the following officers: President, J. R. N. Curtin; vice president, Calvin Butts; secretary and treasurer, A. Sidney Mankin, and general manager, M. R. Rodgers.

The Northern Engineering Works of Detroit has furnished the Goulds Mfg. Co., for the No. 2 plant at Seneca Falls, a six-ton per hour Newten cupola. It has also shipped a similar cupola to the Raquette Foundry & Supply Co., Pottsdam, N. Y.

The foundry of the Ogden Steel & Iron Works (Frank M. Farrell), Ogden, Utah, has been purchased by M. S. Browning, Adam Patterson, R. P. Porter, John Pingree and J. M. Doran, who announce that they will incorporate immediately. The purchase price is given at $10,000.

J. F. Ankenbauer has been appointed receiver of the Porter Iron Roofing & Corrugating Co., Cincinnati, on the petition of E. Spencer Ford, a stockholder and creditor. The company has a capital of $20,000. The plaintiff says the company is solvent, but is unable to meet its obligations.

The Bay State Brass Co., Haydenville, Mass., has passed into the control of the Eastern Brass Co., of New York City. C. K. Sanborn, who is president and business manager of the new company, owns a larger part of the stock of the old. The new management will soon announce plans for additions to the plant.

The receiver's sale of the Northwestern Foundry Co.'s plant at Detroit has been set aside by H. P. Davock, referee in bankruptcy. The plant was sold for $33,000 to the American Blower Co., but this was not enough to pay costs, and the next sale will be held May 4. A new company may be formed to bid for the plant and take it over.

The Columbia Mfg. Co., Columbia, Pa., has purchased from the American Laundry Machinery Co. all of the latter company's real estate located in Columbia. The new corporation will occupy the building for the manufacture of laundry and other machinery. The officers of the new company are: President, John S. Ostertag; secretary and manager, E. L. Smith; and treasurer, D. L. Gladfelter.

The capital stock of the American Tool Works Co., Cincinnati, has been reduced from $500,000 to $300,000, by the retirement of the issue of $200,000 preferred stock outstanding, nearly all of which was held by President Franklin Alter. By authorization of the company this has been provided for and retired, so that now the company will have only one kind of stock. The directors are at present considering the erection of a new plant in another location.

In an interview at Seattle, Wash., C. M. Levy, third vice president of the Northern Pacific railroad, is quoted as saying that the company will spend $1,500,000 shortly for freight cars in anticipation of increased business.

President C. A. Starbuck, of the New York Air Brake Co., declared a few days ago that business has improved of late, and that the company has received a large number of orders from different railroads.

Trade Notes:—

The Wellman-Seaver-Morgan Co. has moved its New York offices to the Hudson Terminal, 50 Church street.

The American Locomotive Co. announces that it has moved its general offices to the Cortlandt building, 30 Church street, New York City.

The directors of the Lake Superior Corporation have decided to move the offices of the company from New York to Philadelphia, about May 1.

The Curtis Screw Co., Buffalo, N. Y., has removed from 1904 Niagara street to 17 Gull street, where the company is occupying the three-story brick building 40 x 80 feet.

Rogers, Brown & Co., whose New York offices were formerly located in the Trinity building, have removed to 1942-1943 Cortlandt building, 30 Church street, New York.

The overhead trolley installations for the handling of projectiles at Fort Hancock, N. J., will be furnished by DeHart & Stafford, 29 Broadway, New York.

The general offices of the U. S. Metal & Mfg. Co., now located at 25 Broad street, New York, will be removed about May 1 to the twenty-fourth floor of the new City Investment building, 165 Broadway.

Charles Engelhard, manufacturer of the Heraeus le Chatelier pyrometer, has removed his offices from 41 Cortlandt street to 32 Cortlandt street, New York City, in the Hudson Terminal buildings.

The business formerly conducted by Emerson P. Harris, broker in publishing property, 253 Broadway, New York City, has been changed in name to the Harris-Dibble Co., with the admission to the firm of Fred A. Dibble, who has been associated with Mr. Harris for several years.

Arrangements have been perfected whereby the ferro-manganese and spiegeleisen manufactured by Pyle & Blaina Works, Ltd., in Monmouthshire, England, will be handled exclusively in this country by Matthew Addy & Co., in addition to their sole agency for Walter Drabble & Co.'s fluor spar and their other ore and alloy connections.

New tenants in the West Street building, 90 West street, New York, include the Aero Pulverizer Co., removed from 80 Wall street; the International Sand Lime Brick & Machinery Co., from 136 Liberty street; and the New Jersey & West Virginia Bridge Co., from the Flatiron building. It is stated that about 95 per cent of the floor space of this building, which is a center for the New York machinery trade, is now occupied.

Fires:—

The foundry of Jonas Moyer, Hatfield, Pa., was destroyed by fire April 14, with a loss of $10,000.

The nut works of the Milton Mfg. Co., Milton, Pa., burned April 21. The loss is estimated at $250,000. The insurance is less than $100,000.

Fire in the structural steel shop of the Minneapolis Steel & Machinery Co., Minneapolis, Minn., April 21, caused a loss of about $40,000, covered by insurance.

The Central Mfg. Co.'s plant at Holland, Mich., sustained a damage to the stock and machinery as well as the building of between $8,000 and $10,000, April 15. The loss is partly covered by insurance.